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COTTON

Volume LXXX
Number One
Ten Cents a Copy

NOVEMBER, 1915

Published Monthly by
W. R. C. Smith Publishing Co.
Dalton, and Atlanta, Ga.

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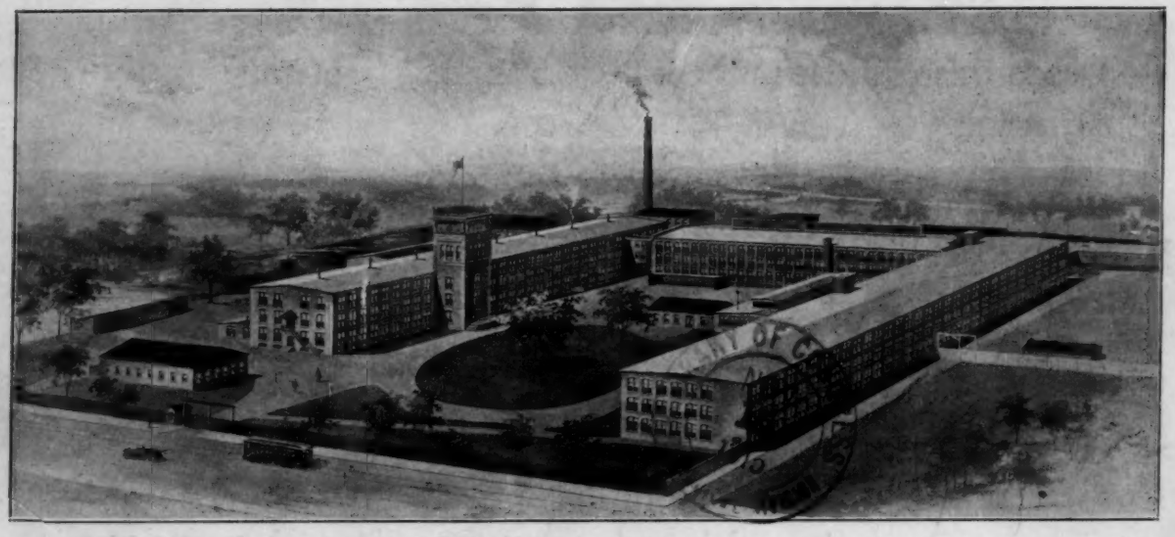
All Products of this Factory bear the Shop Mark

"LEESONA"



¶ *We make "UNIVERSAL" WINDING MACHINES for winding filling for broad and narrow looms—cones for knitting—tubes for warps, wire covering, braiders, thread, twine, cords, tapes, electro magnets and specialties.*

UNIVERSAL WINDING CO., BOSTON

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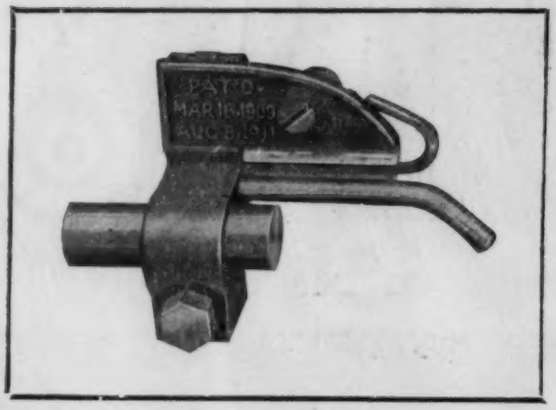

The MacColl Patent Spooler Guide

will, with a much more open setting, remove slubs or bunches that would pass through other spooler guides;

it will allow small piecings and knots which are unobjectionable to pass through;

it will pluck loose slubs and imperfections from the yarn without breaking, holding the slubs, etc., in the teeth until they are cleaned;

it is easily set, cleaned and adjusted;

as it works with a larger opening it requires less frequent adjusting than other guides.

On worsted yarns the production in after processes is greatly increased, as the yarn is delivered practically free from slubs and it is unnecessary to stop continually to remove these imperfections.

DRAPER COMPANY

HOPEDALE MASS.

J. D. CLOUDMAN Southern Agt. 188 So. Forsyth St. ATLANTA GA.

NOV 13 1915

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COTTON

Published Monthly

Volume 80. **NOVEMBER, 1915.** **Number 1**

L. L. ARNOLD, Editor

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Reducing the Fire Hazard of Cotton.

Readers will be interested in the announcement that a company has been incorporated for handling an invention which may revolutionize the present storage and shipment methods for cotton and may also be the means of saving millions of dollars annually to the cotton consumers. This company has been perfecting a solution to be used in dipping cotton that will eliminate the spark and flash fire hazard and prevent country damage. It is stated that this solution has been going through a series of the most exacting tests for a period of three years.

This question of immunizing cotton to spark and flash hazard by dipping, interested the Underwriters' Laboratory of Chicago. W. C. Robinson, chief engineer at the Underwriters' Laboratory, made an eight day trip to Oklahoma to make a personal investigation and subjected a number of treated bales of cotton to the most severe tests. These tests are said to have been much more severe than would be encountered under practical circumstances. Hundreds of burning cinders, lighted matches, cigars and cigarettes were thrown promiscuously on the dipped bales of cotton. These cinders were heated red hot by a blow pipe and varied in size from one-eighth to seven-eighths of an inch in diameter. The effect of this contact was simply to char the cotton, there being no evidence of either fire or flash. Treated cotton was also shipped safely on a flat car from Oklahoma City to Chicago, a distance of over a thousand miles, without the slightest damage from fire by sparks, notwithstanding the fact that this car was placed next to the engine the entire trip.

Mr. Robinson then made a test to establish whether the fiber from the dipped bales had been injured for manufacturing purposes. Therefore some of this cotton was run through the various processes in textile manufacture and it was found on testing that the tensile strength was unimpaired and that no trouble was had with the fiber taking dyes perfectly.

On the basis of this three years' investigation by the Underwriters' Laboratory, it is stated that the National Board of Fire Underwriters has given the process its unqualified endorsement and approval. It has also been approved by the Committee on Cotton Hazard of the Railway Fire Protective Association, representing seventy-four leading railways of the United States.

In view of these facts, the Southeastern Underwriters' Association has made a reduction of $1.00 per hundred dollars valuation on all dipped cotton subject to spark and flash hazard, with an additional reduction of 5 per cent on the remaining premium. This eliminates the entire charge heretofore made by insurance companies on cotton subject to flash and spark hazard. Under the new ruling, cotton can be stored in the open, adjoining railroad tracks,

if desired, and can be left in the gin yard regardless of location after ginning and dipping.

It will at once be recognized that an enormous saving may be made, not only in insurance premiums, but also in freight rates, as the ability to ship raw cotton on flat cars will immediately have the effect of reducing the box car shortage now so common during the rush cotton season. Furthermore, a much larger amount of cotton may be shipped per car on a flat car than can possibly be stored in a box car, if the bales are of the regulation plantation order.

It is claimed for this dipping process, that it also prevents country damage and that the bales may be left on the ground and in the open air for long periods of time without depreciating in value. It is interesting to note that the process of dipping is inexpensive and therefore the resulting benefit will be correspondingly greater. The future of this process will be watched with interest.

Let in the Light.

THEODORE H. PRICE, in a recent issue of Commerce and Finance called particular attention to the apprehension felt by capital as to the ultimate results to business caused by the enforcement or attempted enforcement of the Sherman Law and other similar anti-trust legislation.

For the benefit of those who doubt that the Sherman Law as it stands today is an obstacle to the accomplishment of much that is desirable, Mr. Price gives the following illustration:

"During the past week a firm of bankers in this city were invited to furnish the capital necessary to finance a consolidation of some twenty-six establishments engaged in manufacturing and distributing one of the greatest necessaries of life in three different states.

"The raw material used is produced in the states served. As a condition of the consolidation, it was proposed to increase the price paid for the raw material by 5 per cent and reduce that charged for the finished goods by 3 per cent. Adequate capital for mechanical improvements, utilization of by-products and economy in distribution would have made this possible, while at the same time increasing profits.

"Apparently everyone would have been benefited. The bankers said they would put up the money if the attorney-generals of each of the three states would give them any assurance that the proposed consolidation did not offend the law. All three have replied in effect that their function is to prosecute violations of the law, and not to interpret its application to hypothetical cases. In this they are right, and a thing which is highly desirable will be unaccomplished, because, although it seems entirely legal, there is no one authorized to decide whether it is or is not a technical violation of the many state and national laws that have been passed to restrain or prevent monopoly."

Would not this be a splendid opportunity for the Federal Trade Commission to demonstrate its usefulness by advising those who may be interested in promoting lawful combinations of capital, as to the application of present anti-trust laws and any limitations which may be placed upon the liberties of such combinations of capital by legal action on the part of the Attorney Generals of the various states? Work of this character on the part of the Commission would be of such a constructive nature as to render a real aid to the business world. May we not hope for some early and definite action on the part of this commission, that will tend to relieve the haziness now obscuring much of the recent anti-trust legislation, thereby indicating to the layman what was really intended and desired by Congress when it placed these enigmas on the statute books?

India.

An export field that has not in the past been given adequate consideration by American manufacturers—a field moreover of almost limitless potentialities—is that of India. That Empire, by reason of its vast population, its splendid (even if unequally distributed) resources, and the new wants created by the gradual development of modernity among an ancient people, presents to the American exporter a singularly attractive opportunity for the exercise of his commercial acumen. It is a land where poverty exists by the side of almost fabulous splendor; where famine may succeed a time of plenty; where the intensity of tropical heat and the great rains of the monsoon cause strange conditions in the preservation and sale of merchandise; where religious beliefs or racial traditions may constitute the determining factors in the marketing of goods.

India has been characterized by a recent writer as "the treasure sink," and to an American commercial traveler it seems "like a bottomless pit, into which supplies may be sent in an endless stream." Certain it is that the Indian field is eminently worth cultivating, and that to work it effectively much information is needed, of a specific and not always readily available kind. Those engaged in the furtherance of American foreign trade have been devoting to it the most thorough and painstaking attention, and to these investigations a special timeliness has been imparted by the European war. India, in 1913-14, imported from Germany and Austria-Hungary, respectively, $41,092,000 and $13,920,000 worth of goods.

India has a population of 315,000,000, and an area of 1,802,192 square miles. Its imports in 1913-14 amounted to the enormous total of $594,517,000, of which the United States furnished only $15,542,000. The value of American products consumed annually in India is less than $0.04 per capita. Persons qualified to form an authoritative opinion believe that this should be very materially increased.

There has just been published for the Watuppa Ponds and Quequechan River Commission, of Fall River, Mass., a most unusual report of the consulting engineers, Fay, Spofford & Thorndike, of Boston. Including the Commission's report, this forms a volume of more than 200 pages, with copious ilustrations from photographs and drawings, as well as a pocket of maps showing different phases of the proposed development.

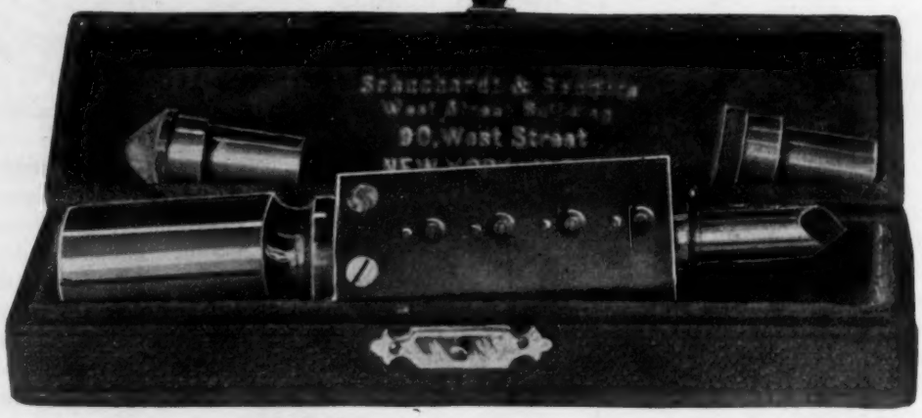
Some of the the engineering features are unique, including the three-story conduit for carrying hot discharge and cool condensing water for the mills, besides surface drainage. A common cooling pond is designed for all the mills along the river. The civic problems met include a new sewage system, the abatement of nuisances along the river, the conservation and control of water, and a number of other items having unusual features.

It is estimated that the proposed work will cost nearly three million dollars, of which almost one-third will be paid for from the sale of 146 acres of land to be reclaimed along both banks of the river.

Manhood and womanhood does not depend on muscle. Apparent size is one thing, real size is another. If you don't believe it, try to stop a hornet with the end of your nose when he is going a mile a minute.

$5.00 Imported High Speed Indicator Outfit in Case

FREE To You for a few Minutes of your time.



Our Service Department desires the opinions of active mill men on the quality of the work shown in the advertising pages of this issue of COTTON.

We are, therefore, going to give this indicator for the best letter by a mill executive who gives the clearest and most definite reasons why, and in what manner, any certain advertisement is, in his opinion, the best.

Contestants must be mill executives, from overseers to presidents, connected with spinning, weaving, knitting, or finishing plants. The letter must be accompanied by the name, address and official position of the writer in order to be eligible.

The judges will be the Editor of COTTON and the Manager of the Service Department, whose decision will be final.

Address Contest Department of COTTON, Atlanta, Georgia.

The awarding of the advertising contest prize for the September issue of COTTON was a somewhat difficult matter because of the good quality of the numerous replies. The winner this month is G. V. Frye, overseer of carding at the Pacolet Manufacturing Co., Trough, S. C.

The following gentlement deserve honorable mention: J. A. Warren, designer, Concord, N. C.; L. E. Anderson, superintendent, Charlotte, N. C.; S. L. Adler, superintendent, Magnolia, Miss.; and J. V. McCombs, superintendent, Egan, Ga.

The contest announcement is repeated in this issue and contest letters are eligible in this competition if received before or on December 15th. Letters received later than December 15th will be barred from the contest.

The Winning Letter.

BY G. V. FRYE.

It is my opinion that the advertisement of the Clayton & Bentley thin-place preventer in your issue of September, 1915, is the best, for the following reasons:

They take plenty of space to present what they have for sale, and they make it attractive. Then they give a good clear cut of the article for sale, so the buyer can see, and see easily, how the thing works and what it is, while they tell in good clear type what it is and what it is for; why and what it saves; and *what it costs.*

Buyers often ask this question "What will it cost?" when hearing of methods to improve what they already have. This might not be good business in all things, but when it can be done, it helps. A good buyer always counts the cost.

After this they tell what they have done, and how many satisfied customers they have. This shows that the article is not an experiment, and furthermore they offer to show the buyer without putting him under obligation.

It is my opinion that in Clayton & Bentley's advertisement the buyer can understand just what they have, all the necessary information is on that page and all the buyer has to do is ask for a sample to be submitted for trial.

Condensed, the advertisement shows what they have for sale, tells what it is for, what it costs, gives a line on business done to show they are not experimenting, and offers to show the goods without obligation on the part of the inquirer. What more can be shown in an advertisement?

Trough, S. C., Oct. 21st, 1915.

L. L. Arnold,
Editor COTTON,
Atlanta, Ga.

Dear Sir:

I have just reseived the speed indicator you offered as a prize in your September advertising contest and to say I am delighted is to put it mildly. I assure you that I appreciate it very much and take this means of thanking you.

Yours very truly,
(Signed) G. V. Frye.

Safety First and First Aid in Factories

BY JAMES H. MURRAY.

The owners and managers of every manufacturing concern who have had the genius to employ efficiency engineers as a necessary constructive and progressive factor in its business, not only to produce better and more uniform goods, but at a less cost and a greater profit, have demonstrated to the less favored everywhere that the growth possibilities of their business cannot be developed by the continuance of old time, easy-going methods, and that the best that is in their business cannot be had from employing the near by, handy to, and imagined to be "just as good and costs less" sort of engineers as reconstructors, for there is the same degree of difference between engineers as there is between doctors, lawyers, men generally and machines.

To install an innovation indicates sufficient freedom from detail and with a mind open enough to make the necessary comparisons between the old and more selfish methods of yesterday and newer, better and less selfish methods of today and tomorrow, wherein the cooperation of the employee is considered and appealed to as a working factor and partner and the best that is in him developed to that end. Like everything else that is worth having, this costs money, not much, but some, but is money well spent and becomes not only a good investment, when considered by itself, because of the increased interest of the employees in the business, but it is worth more than it costs to the owners of the business.

The safety-first propaganda has brought about the standardization of guards, and has resulted in the better safeguarding of machinery and the reduction of accidents. It takes time and patience and expense to train an employee to become valuable as a workman. A serious injury to a skilled workman results in a loss to his employer; many manufacturers now realize this. The progressive business man is using every means to safeguard all hazardous features about his plant. Safety-first means to him economy-first. But there are still acidents, many of them, and to provide for the care of the injury, many of the large factories have fitted out emergency hospital rooms and workmen's welfare departments. Some of the large plants employing a great many men have safety-first and workmen's welfare committees and regularly retained physician.

All concerns cannot afford to employ a physician, but all plants can and should have a safety-first and first-aid committee composed of its own men, whose duty should be to see that all hazardous features are safeguarded and to examine into and investigate the cause of all accidents.

Every factory should have a first-aid box containing antiseptic solutions, bandages, dressings, etc., on each floor. If the plant is spread out, there should be a first-aid box or cabinet in each department. Certain picked men should be delegated to familiarize themselves with the contents and the uses of the different articles in these first-aid boxes and to give prompt assistance and care for the injured person. Even the seemingly insignificant cuts and bruises should be given immediate attention, which otherwise, if neglected, might result in a serious case of blood-poisoning, incapacitating or causing the death of a valuable workman. Great results from small causes, like great oaks from acorns, grow. Many trained men are afraid to report to their foremen an accident to themselves, because they consider it insignificant. And where there are no first-aid boxes or other facilities provided, workmen meeting with a slight accident say nothing, and go along without receiving the proper care, and very often as a result of the employee's indifference or their own carelessness, later on become incapacitated. Even if such a man does not become disabled, the loss by his decreased efficiency is many times over the cost of the proper outfit. The first-aid outfits are that, nothing else, and answer every purpose until the injured person is examined by a competent physician, when the injury is of a nature to require such attention and care.

Many plants manufacturing products the process of which cause occupational diseases are beginning to arrange to have their workmen examined periodically by qualified medical examiners and to make proper provisions to care for the workmen exposed to particular occupational diseases, or to experiment to change the process so as to minimize the danger. Some men are more susceptible to certain occupational diseases than others. Where this is found, these men are put at other work, sometimes saving a very valuable workman, and at no loss to the employer who is called upon to exercise his humanity and good fellowship.

New plants carrying on extraordinary operations, starting up in a location where they are obliged to hire all new men unskilled in the process of the work, and plants starting up, after having been shut down for a long time, with many of their former skilled men scattered and located elsewhere, experience a great many accidents, until by the process of selection, precaution and training of new men equip them to safely take the places of the old men. These plants should, at the very beginning, organize a safety-first and first-aid committee. It saves accidents, time and money, and many times it preserves the life and efficiency of a valuable workman.

The home life and habits of workmen in large industrial districts cannot always be controlled, but by providing safeguards to dangerous machinery and medical attendance or at least first-aid boxes in their plants, so that men become careful and learn to care for themselves and their fellow workmen about the plant, they soon acquire regular habits and by doing so, become more efficient and easier controlled under the system of scientific management.

The safety committees should be composed of the best men in the plant, changed from time to time, so as to encourage individual responsibility and disseminate the safety spirit throughout the works. The head of the concern, managers and foremen, should become active in it and show enthusiastic interest in the successful carrying out of the movement. Reports and records of all dangerous and exposed features, all accidents, their cause and preventives should be kept. Meetings of the workmen and executive officers should be held and addresses made on the subject. Printed suggestions, in different languages where necessary, should be given the men, and a feeling of interest and enthusiasm created all around.

An active interest taken by all concerned in a manufacturing business makes easy the problem of working out and perfecting the details for prevention of accidents as well as for the production of its goods. But no hope of success need be expected unless the plan is first thought out, and active interest taken by the president, manager, superintendent, foremen and men.

Fulfilling Promises to Customers.

BY A. M. OLIVER.

One of the more important features of a manufacturing plant and one of the things that will gain the confidence of merchants whether they be retailers, wholesalers, jobbers or converters, is the assurance that goods will be invoiced on the day promised. To make a promise is one thing and to keep it is another. A merchant cannot be expected to fill his contracts if the factory fail to fulfill their promises for delivery.

The matter of promising delivery is a serious one and should be given very careful attention. The selling house of any mill is expected to make a promise for delivery on almost every sale of goods. To obtain a date for delivery it becomes necessary for the selling house to confer with the correspondence department of the factory. The correspondence department must be able to give a definite date for delivery. On the strength of this promise, the selling house makes a promise to the merchant. It now becomes essential that the promise made, be kept, otherwise the merchant will be annoyed and will immediately complain to the selling house.

To handle a promise system efficiently but two forms are required. One of these forms may be called the "Request Sheet" and the other the "Broken Promise Sheet." The request sheet shows the account, lot number, style, manufacturing order, department, pieces, amount wanted, promise date and signature of the man making the promise. The broken promise sheet shows the account, lot number, manufacturing order, amount promised, name of man making promise, date when promise became due and the superintendent's or agent's name to whom the broken promise sheet is mailed each day.

A request for a promise for delivery from a customer means that the selling house must write the correspondence department of the mill. It is the duty of the correspondence department to send out a request sheet to the department in which the goods are being finished, telling them exactly what is wanted. There is one man in each finishing department known as the "Promise Man," whose duty it is to make all promises and also see that the promises are filled on time. This man receives $1.00 added to his pay each day that no promises are reported broken by the correspondence department. The correspondence department makes a record of each promise made and checks the list the first thing every morning. On the broken promise sheet are listed the deliveries that the promise man has failed to get out on time. This sheet is mailed to the superintendent each morning. If there were no broken promises a sheet is sent, across the face of which is marked, "No broken promises today." In the event that the promise man finds that he is going to be unable to keep his promise he will notify the correspondence department before 5 P. M. on the day the promise comes due and will give a new date for delivery. The correspondence department will immediately write the selling house, giving them the reason for failure to deliver as promised and at the same time give a new promise date. This eliminates complaints from customers and assures them that everything possible is being done to fulfill the promise made.

CORRESPONDENCE DEPARTMENT

MO	DAY	YEAR

MR _____

Please advise writer at once dates when the following orders will be ready for invoicing. Should any corrections later be necessary, inform writer immediately.

Yours truly, _____

ACCOUNT	LOT	STYLE	M.O	DATE	PCS	KIER	WANTED	PROMISED FOR INVOICING BY

PROMISED BY _____

THE REQUEST SHEET.

CORRESPONDENCE DEPARTMENT

MO	DAY	YEAR

MR _____

The following promises for invoicing goods have been broken:

Yours truly, _____

ACCOUNT	LOT	STYLE	M.O.	PROMISE	PROMISED BY	REMARKS
Wamsutta	44	5962	9069	2 cases	J.Smith	
Mills & Gibb	116	2700	9140	100 pieces	" "	2nd time broken

THE BROKEN PROMISE SHEET.

The promise man has somewhat more of a job than is expected from this explanation, for it is necessary for him to carefully watch the promises that are coming due and locate the goods. These goods must be given preference. He must see than the goods are not only packed but that the invoices are in the han of the invoice clerks in time to be invoiced on the day promised.

If a second promise is made and broken the broken promise sheet is marked "second time broken." Thus the superintendent can see exactly how the shipments are being made.

Experience with this method of making and tracing promises has proved that every promise broken has a good reason for being broken. It isn't broken because somebody forgot about it or because of neglect. It isn't broken because the goods were finished too narrow or because they were starched wrong, dirty, wrong shade, too blue or too hard. The promise man is watching all these conditions and he plans to have his goods in the finishing department in ample time to return them for refinishing if necessary. Every promise broken means that the promise man loses $1.00 and that the superintendent knows he has fallen down. No excuse of short time or holidays is accepted. He must plan for these things when making his promise and must get the goods away on the day promised.

More light on Barrett specification roofs is the title of a recent folder sent out by the Barrett Mfg. Co., of New York and illustrating Nela Park near Cleveland, Ohio, the home of the great modern plant of the National Lamp Works of the General Electric Company. This is the plant where the well-known Mazda lamp is made. This folder describes the seven great structures and shows that not only are the structures covered with Barrett specification roofs, but the foundations and all connecting tunnels are waterproofed with specification pitch and felt, and practically all of the buildings have "Tar-Rok" sub-floors. It is an interesting folder and one worth looking over.

Do not step on or off the elevator while it is in motion.

D. D. Felton Brush Company Enlarges.

The D. D. Felton Brush Company at Atlanta, Ga. has found it necessary to greatly enlarge its facilities. In order to do this it has acquired additional floor space in the same building, practically doubling its former size and has added to the machinery equipment a complete woodworking outfit.

There were two primal reasons for this change. In the first place, because of the greatly increased prosperity among the cotton mills and the large amount of work being done by them at the present time, a large amount of brush repair work was being sent in. In order to handle this repair work with promptness and dispatch, and at the same time keep the manufactured lines moving, it became necessary to secure increased space and additional machinery.

Another factor in the situation was that Jas. B. Fitch, the wide awake manager of this organization has for a long time noted the lack of an adequate pattern shop where local and nearby industries may have wooden patterns prepared by expert workmen at reasonable prices. Therefore, when making his enlargements and purchasing the additional machinery, he prepared for this deficiency and now has a fine, up-to-date commercial pattern shop wherein he is prepared to do accurate work of this character. He has added to his force of mechanics a pattern maker with years of experience and well equipped to handle any pattern job that may be desired.

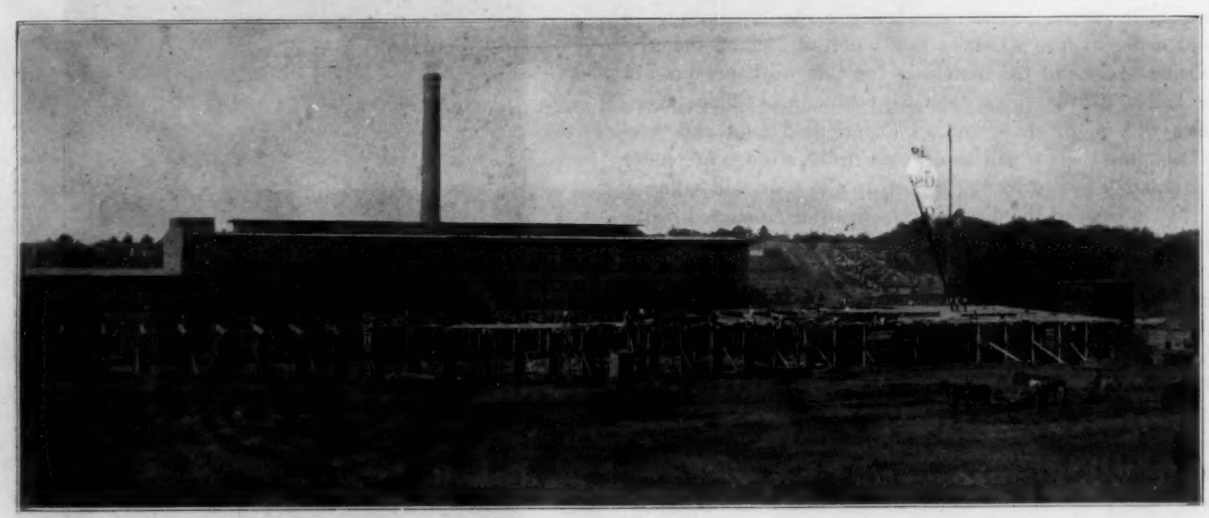
While the war has, in many instances, interfered with the supply of raw material used by brush makers, the Felton Company prepared in advance for this shortage by securing a considerable amount of raw material and despite the great quantity of new and repair work being turned out, we are advised that they still have a sufficient supply of the various raw materials to last for quite an extended period.

Many young people are good in the beginning, but they are like the fellow that was killed by falling off a skyscraper—they stop too quick.

Making Better Men and Women

The illustration on this page shows the new Hillside Cotton Mills at LaGrange, Ga., in process of construction and as it is today. The main mill building is practically completed as is the power plant and warehouse facilities. In the foreground is shown the weave shed which is still only partly done. The building contractors are approximately thirty days ahead of schedule, while the machinery equipment has already begun to come in and is about fifteen days ahead of contract delivery date.

At a casual glance the reader may not grasp the connection between the caption of this article and its illustration, but let us consider the surroundings at this mill and the other mills belonging to this group. There are four mills in this group controlled by the Callaway-Truitt interests. The Unity Cotton Mills, the Unity Spinning Mills, the Elm City Cotton Mills and the Hillside Cotton Mills, shown herewith. These four mills are so located as to enjoy to the fullest extent the splendid city schools of LaGrange, but the moving spirits in these industries were not content with merely furnishing educational facilities for the children of their operatives. As one of them expressed it, it is a difficult matter to teach old people new methods of living, but it is comparatively easy to train children in the right direction so that the next generation will show the splendid results accomplished by the work done now.



Hillside Cotton Mills, LaGrange, Ga. The Weave Shed is Seen in the Foreground. The Warehouses Extend Out from the End of the Mill to the Left and Beyond the Scope of the Picture. Note the Operatives' Cottages on the Hill in the Background.

In the fall of 1906 the work of the LaGrange Settlement was begun by the Rev. Henry Disbrow Phillips in the village of the Unity Cotton Mill. The beginning was small, but with active cooperation the activities of the Settlement were increased and its usefulness enlarged. The effectiveness of the undertaking has been made doubly effective by the service of women resident workers who have done much to aid in the movement.

Plans were completed in 1912 for the opening of the training school in connection with the Settlement activities to meet a growing demand in the South for women of this character. To give the work stability and continuity, a charter was granted on Feb. 5th, 1913, incorporating it as the LaGrange Settlement.

Card index records are kept of the families among whom work is done with their history, visits, etc. The Settlement activities are among the people in the villages of the four mills already named which constitute the principal body. There is, however, a branch settlement on the same order in connection with the Manchester Cotton Mills at Manchester, Ga., which is controlled by the same interests.

At the training school an effort is made to graduate well rounded workers who are specialists in some line of activity, either as kindergarten teachers or settlement nurses. Primarily the training is planned to meet the conditions among cotton mill operatives of the South, but it is adapted to social and benevolent religious work among city, rural or mountain districts in the South. The school endeavors in practical training and in courses of instruction to so correlate social welfare work and religion as to find ultimate expression in social activities. The regular courses lead to graduation in kindergarten work and in settlement nurses.

The appliances and equipment of the buildings in connection with this plant, which consists of a mission house, the center of the institutional work; the hospital of the Good Shepherd with 14 beds, an operating room and dispensary; and the home, a dormitory for students and resident workers; are thoroughly modern. The home is so arranged as to give the workers and students the greatest incentive to foster the "home life."

In connection with this settlement work are the following organizations which are intended to better the condition of the workers: three kindergartens; two kindergarten clubs; two little girls clubs; a sewing class; a cooking class;

and two boys' clubs. Then comes the doffer' club, two junior auxiliaries, a sword and shield club, the night school, two cross and crown societies, and a young women's club. In addition to this there is a men's club, two women's clubs, a society of union social workers, four boys' and girls' garden clubs, besides the Union church and Sunday school activities.

While most readers are familiar with the work done along these lines, there are one or two items which will bear enlarging in this case. It has been the ambition of the men at the head of these mill organizations to encourage their operatives to develop the ground, which is liberally alotted around their homes, to a better advantage from the standpoint of flowers and food-stuffs. They found upon investigation that too many people "live out of a can" so to speak and it was their desire to encourage better gardens, more fresh vegetables, and a closer acquaintance with the good things furnished by nature. Because of this they formed four boys and girls garden clubs and gave them every encouragement to produce gardens that were really worth while. Spaces were set aside for this work separate from the home grounds and much has been accomplished during the past few years along these especial lines.

To still further increase this interest in flowers and food-stuffs, arrangements are being made at present to build a greenhouse within a few hundred feet of the new Hillside Mills and the materials for this work are now in the hands of the transportation companies. This greenhouse will be in charge of an experienced man and part of the space therein will be devoted to the storage of tender house-plants owned by the women in the four mill villages. This is to prevent the disappointment so often caused in the propagation of such house-plants, when the careful attention given them during the summer months only results in having them killed during the winter months because of a lack of a suitable place to store them. The balance of the space in this greenhouse will be devoted to the propagation of early seedlings by the boys' and girls' garden clubs whereby they will be enabled to make an early start in the spring with young plants developed under glass. This will allow the villages of the four mills to be furnished with early vegetables of their own raising at absolutely no expense to themselves other than the labor entailed, which, under the methods now adopted, becomes a pleasure and a pride to the young people of the villages.

Another feature decided upon by the head of these mills is to perpetuate a park and playground for the operatives of the four mills. In order to do this, eighty-five acres of virgin timber land has been deeded to the mills in such a way that no mill may sell or otherwise dispose of any part of this property without the consent of the other three mill organizations. This eighty-five acres will be set aside as a perpetual park for the people and will contain the various playground features so frequently found in mill communities, but seldom upon so large a scale as outlined here. The edge of this park is less than two minutes walk from the Hillside Cotton Mills and is located on high, dry ground especially well adapted for the purposes to which it is to be devoted.

A careful consideration of the features outlined will, we believe, convince the most skeptical that the caption given to this description of the Hillside Cotton Mills and its adjoining factories is eminently correct. They are doing more than manufacture cotton goods in those mills. Moreover, let it be thoroughly understood, in propagating work of this character these mill organizations are not the exception, but the rule, and many other similar sets of conditions may be found all the way from Maine to Texas.

Ball Bearings for Cotton Mills.*

BY ELLIOTT A. ALLEN.†

Before discussing the value of ball bearings for cotton mills, let us understand the construction of this type of bearing. In 1907, Sven Winquist, a resident of Sweden, invented and marketed a ball bearing which embodies features which are unique and quite distinct from any other ball bearing designs as shown in Figure 1. The inner race of the ball bearing contains two grooves, each ground to a radius slightly larger than the radius of the balls. The outer race is ground in the form of a section of a hollow sphere whose center is the center of the axis of rotation. It should be noted that the two rows of balls and inner race are free to rotate at any angle within this spherical outer

ELLIOTT A. ALLEN.

race without subjecting the races to any undue strains, allowing a perfect "ball and socket" or self-aligning action.

The ease with which this bearing performs its functions of light running under conditions of shaft mis-alignment, is appreciated when it is pointed out that the balls roll on the surface of the spherical outer race with a pure rolling motion. It is automatically self-aligning, therefore the balls are not subjected to undue loads or pinching. Also, the fact that two rows of balls are used in each bearing, means less load carried per ball, hence greater durability. The old trouble from cracked balls is entirely eliminated with this double row, self-aligning design.

These bearings are made of high grade, special analysis, Swedish steel, free from sulphur and phosphorus. Each ball is ground to practically perfect sphericity, the races and balls being polished to a mirror-like finish.

The application of ball bearings in cotton mill machinery

*Extracts from a paper read before the National Association of Cotton Manufacturers.

†With S. K. F. Ball Bearing Company, New York City.

has developed ingenious and simple housings which completely protect the ball bearing and prevent leakage of oil. Therefore, the textile industry has gained an important feature; *i. e.*, absolute cleanliness and economy of lubricant. In each of the following illustrations of ball bearing equipments, it will be well to observe the compactness of ball bearing boxes or housings, their simplicity and ease of application.

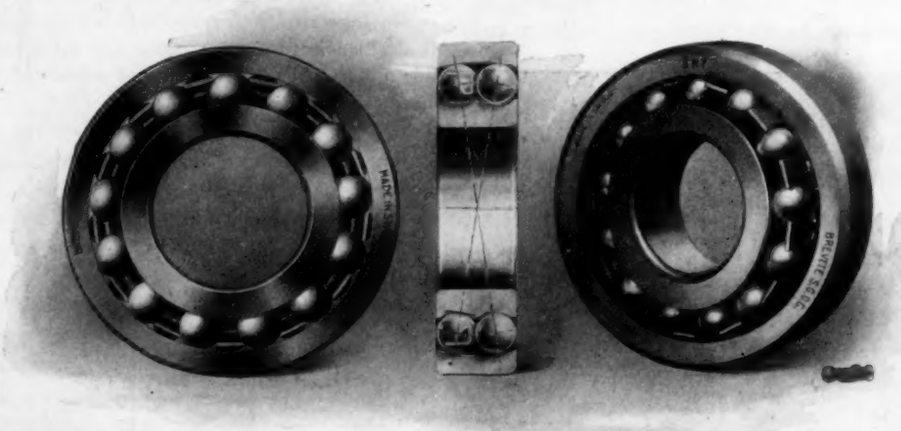


FIG. 1. RADIAL BALL BEARING, SHOWING AT THE LEFT THE BEARING IN NORMAL POSITION, SECTIONAL VIEW IN THE CENTER AND DEFLECTED POSITION AT THE RIGHT.

COTTON PICKERS AND OPENERS.

The English were the first to apply these ball bearings to beater shafts. The power considerations were, first, power saving obtained, second, maintained durability of the ball bearing, third, cleanliness. These beater bearings have been installed extensively since 1907, and in no case has wear within the bearing been detected. Numerous tests on domestic made pickers, openers and finishers equipped with these ball bearings show an average of ¾ horsepower per beater—in all cases the power saving has been in excess of ½ horsepower or over 10 per cent of total power consumption.

For a practical example of the value of ball bearings to beaters, assume a power cost of $30.000 per hosepower for a three thousand hour year, ¾ horsepower means a saving of $22.50 annually per beater or a return of 75 per cent on the ball bearing investment.

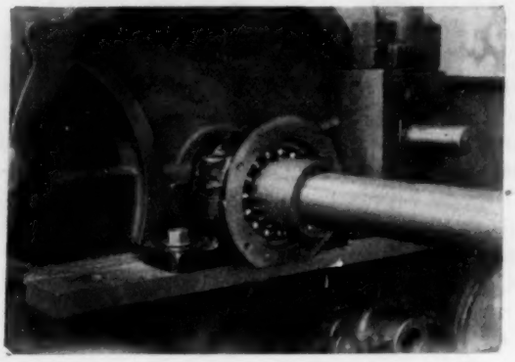


FIG. 2. BALL BEARING BEATER BOX.

The durability of ball bearings means no repair trouble to boxes or the beater shafts, for the rubbing friction is eliminated. These ball bearing picker boxes (see cuts 2, 3 and 4) are leak proof, therefore, the beater sides are clean and dry without their usual collection of oily fly. Most of the mills prefer to use grease for these ball bearing boxes, and only once a month is it necessary to add lubricant. For ten hours a day service, 10 pounds of good neutral vaseline grease will supply one pair of beater boxes for a year, which means much in saving of labor and up-keep costs.

One of the most important features of ball bearing application to the mill superintendent is the ease with which the change can be made from the plain bearing beaters which are in use to the ball bearing type. No machine work whatsoever is required at the mill, unless the shaft has been worn badly. The ball bearing box is made to replace any type of plain bearing box, and the type of ball bearing furnished is adaptable to shaft sizes already in use. See Figure 5. By slipping the tapered collar and ball bearing over the beater shaft to its desired position and tightening the lock

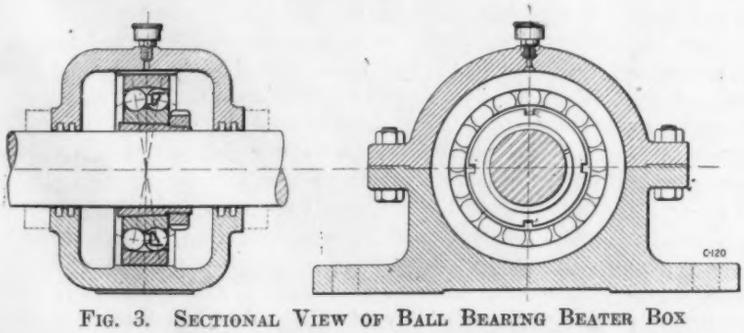


FIG. 3. SECTIONAL VIEW OF BALL BEARING BEATER BOX FOR OPENERS, BREAKERS AND FINISHERS.

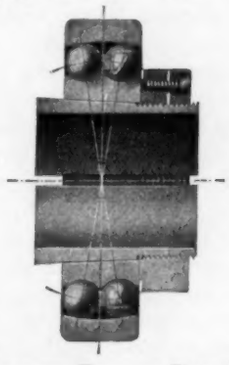


FIG. 5. ADAPTER TYPE OF BALL BEARING.

nut, the entire ball bearing and collar is clamped to the shaft and rotates with it.

Ball bearings have also been used extensively on the fan shaft of pickers where the features have been, first, protection from abuse and intrusion of dirt; second, freedom from vibration of wear; third, infrequent attention and lubrication; fourth, slight power saving.

COTTON CARDS.

The application of ball bearings to the main cylinder of cards was first introduced by the German card builders, and

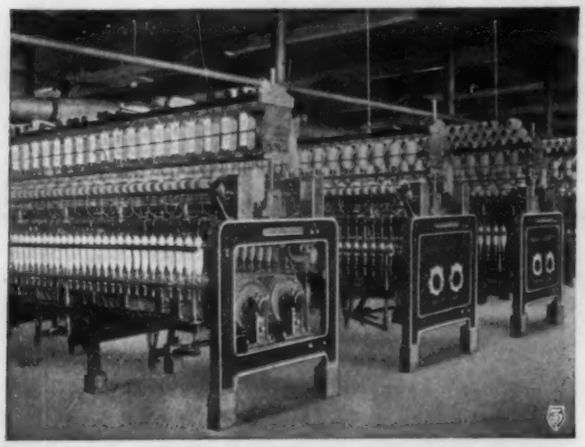


FIG. 6. BALL BEARINGS ON CYLINDERS OF AN ENGLISH FRAME.

there are a number of ball bearing cards to be found in this country. The particular feature of absolute cleanliness and the maintained accuracy of ball bearings, together with the ease of starting the card cylinder, has brought this application beyond the experimental stage.

Figure 6 illustrates an English double cylinder frame with ball bearing boxes. This application has been regarded as one of the earliest in the cotton mill industry, and came out about the time of the first tape driven frame. The success of this ball bearing is obvious, for no matter how the band pull may vary, the almost frictionless operation of the ball bearing boxes remains constant. A set of tight bands will increase the power consumption about 15 per cent with plain bearings and consequently slow down the production. This is not possible with ball bearings. Further, the lubricant often becomes set or squeezed out of the plain cylinder bearings from the week-end shut down, and the starting load is often terrific, especially with tight driving belts and small pulleys. All this difficulty is easily overcome by the use of ball bearings, for the amount of friction does not increase with the load or spindle band and driving belt pull.

The self-aligning feature within this ball bearing overcomes the necessity for trunnion or swivel boxes and their attendant nuisances. The box for the self-aligning ball bearings is bolted rigidly to the frame cross girts, and after once leveling, no further attention need be given, for the automatic aligning feature of the ball bearing serves its purpose. These boxes require very little lubricant—it is preferable to use grease forced in with grease guns once in two or three months, which means no dripping of oil on the cylinder frames or floors to collect dirty lint. Also, the coolness of these bearings help to maintain a very even temperatured spinning room, for under no abnormal conditions of load or speed will heat be generated by properly mounted ball bearings.

It is well known that belt slippage caused by oily fly and tight running cylinder bearings amounts to from 10 to 15 per cent, and even more in old mills with low head room with tight belts or small driving pulleys on the frame. The application of ball bearings to cylinder shafts eliminates practically all this slippage on account of the light running of the bearing. Therefore, if the belt slippage is reduced, higher speeds may be maintained and more uniform yarn produced by the constancy of the drive.

On tape driven frames, ball bearing cylinder shafts are of decided advantage because the tape pull is all on one side of the bearing; *i. e.*, not equalized as on the band driven frames.

The following figures are extracts from tests on motor driven ring spinning frames. Each frame was identical, spinning the same yarn at the same time and with the power consumed by the driving motor itself deducted in all cases, giving exact net horsepower required to drive the frame itself.

472 spindles, 2 1-5 inch gage, No. 33's yarn.

Cylinder Speed Revolutions per Minute	Spindle Speed Revolutions per Minute	Power Consumed Plain Cylinder Bearings Horsepower	Power Consumed Ball Bearings Horsepower	Power Saved to 1 Horsepower
790	8,500	4.90	4.38	.52
870	9,300	7.17	6.24	.93
1,000	10,800	10.62	9.12	1.50

This shows savings varying from 10 per cent to 15 per cent of the net power and also proves that as the speeds are increased, so are the power savings.

The other test was as follows:

364 spindles on No. 24's yarn.

Motor Speed Revolutions per Minute	Cylinder Speed Revolutions per Minute	Spindle Speed Revolutions per Minute	Power Consumed Horsepower	No. of Spindles Horsepower
Cylinder Plain Bearings 1,300	820	8,220	4,133	88
Cylinder Ball Bearings 1,320	840	8,380	3,906	93

which shows, by the use of ball bearings, an increase of spindle speed of 150 revolutions, or about 2 per cent increase in production, and at the same time a power saving of .227 horsepower, or 5½ per cent of total power. In this country various tests have been made and the results have been practically the same as those above. One of the largest spinning frame manufacturers in this country conducted a series of tests in their own experimental department and found a saving of about 50 per cent of the power required to drive the cylinder bare, and no increase in power consumption on starting. That is, the starting effort was no greater than the power required after the machine was in operation.

SPINDLES.

Only within the past few years has a successful ball bearing spindle been developed. The heaviest types of spindles lend themselves most easily to the application of the modern ball bearings, and some eight years ago, English heavy flyer spindles were so equipped. These ball bearings were used in the upper rail of the fly frame and acted as a step bearing as well as radial, although the bottom rail chiefly was retained to steady the spindle.

In this country there has been an interesting development of heavy twister spindles. A well known mill producing tire duck, has had in constant operation for a period equivalent to more than five years, ball bearing twister spindles as shown by Figures 7 and 8. Not one adjustment or replacement has ever been made in this application, which proves the reliability of this type of ball bearing spindle. These spindles were carefully examined recently and it is

reported that the wear on the ball bearings is practically nil. From these indications, it would appear that the life of this type of heavy twister spindle would not be less than twenty years. A photo taken in this spinning room is shown in Figure 9. These are 132 spindle frames running 23 ends of No. 19 yarn at 2700 revolutions with 4½ inch rings

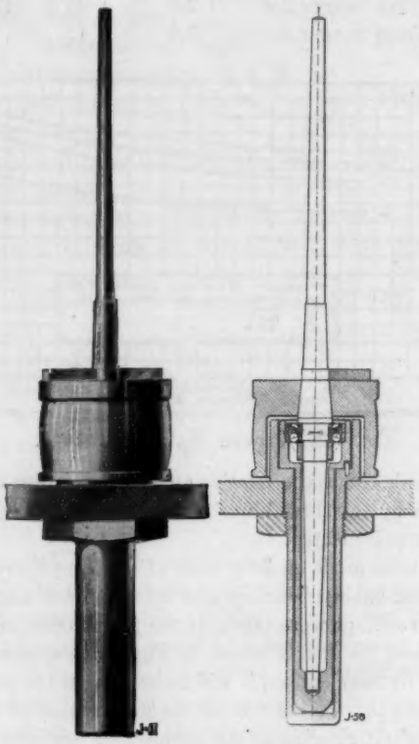


FIG. 7. BALL BEARING RING TWISTER SPINDLE.
FIG. 8. SECTION THROUGH TWISTER SPINDLE.

and operate practically twenty-three hours a day, making tire duck yarn. They are belt driven and comparative tests show a net saving of 1.1 horsepower per frame with ball bearing spindles. This power saving figured at $25 per horsepower 3,000 hours per year nets a saving of a 6,000 hour year of $55 per frame annually to the mill, besides producing a more uniform yarn on account of the light running of the spindles.

In other words, the initial cost of ball bearing spindles will be returned inside of two and one-half years of operation, or five years of ten hour day service. Under ordinary service, the investment in ball bearing spindles yields 20 per cent profit and practically no repairs during the life of the ball bearing, which is conservatively estimated at twenty years.

Ball bearing equipped spindles, because of their easy driving, have a tendency to produce yarn of uniform and full theoretical twist. Because of this fact, in many cases the twist may be less than that required by plain bearing spindles.

The difference in band tension has less effect on the speed of ball bearing spindles, therefore, a uniformity of yarn can be expected from bobbins taken from newly banded frames as well as those that have been used for a considerable length of time. The light running of the ball bearing spindle is maintained over a wide range of band tension, because the coefficient of friction of ball bearings is practically the same under all loads. This means that all band driven frames may be brought to modern efficiency and to compete successfully with new tape driven frames by the use of these ball bearing spindles. Also, because of the reduced slippage of belts and bands, higher spindle speed may be obtained, giving greater production, less breakage, stronger and more uniform yarn.

Lastly, and of prime importance, is the power saving of ball bearing spindles. Tests have been made on spindles only and records of 30 to 33 per cent power saving are shown. Under operating conditions in the mill, these savings are reduced 12 to 18 per cent because of the frictional losses through the entire frame. Also spinning and twisting conditions vary so widely, due to traveler weight, top roll weight, speed, twist, etc., that power savings from ball bearing spindles will also vary; but a conservative estimate would be 15 per cent of the total power.

NAPPERS.

Probably one of the earliest and most extensive applications of the modern ball bearing to textile machinery was made by the German napper builders some eight or more years ago. The severe service of the worker rolls produce journal friction, which consumed an excessive amount of power and destroyed the plain bearings. These rolls operating at high speeds, on account of their length, are subject to "whip" or "ballooning," which makes use of self aligning bearings imperative. The severely tight belts used on these workers create a high bearing load which feature favors the use of ball bearings.

On a 36 roll, 80-inch napper, 8-inch belts are used and 3¼ horsepower is required to drive these rolls alone, and about 5¾ horsepower when the complete napper is in operation. Formerly with plain bearing worker rolls, over 8 horsepower was consumed, thus showing a saving of approximately 30 per cent in favor of ball bearings.

Because of the extraordinary nature of the service demanded of them, fans and blowers are subject to operating conditions seldom imposed on any other type of machinery. Often located near ceilings, in sub-basements and other out-of-the-way places where it is inconvenient to oil or inspect them, they are very easily overlooked. For this reason ball bearings which require attention but three or four times a year, are particularly useful on this type of equipment.

Plain bearings suffer from neglect. They must be carefully oiled and watched, as inattention is likely to prove disastrous. Lack of oil and continuous running at high speed under heavy load frequently cause overheating with subsequent seizing of the bearing. Fires often have their origin in overheated bearings.

Due to the self-aligning feature of the ball bearings the weight of the overhung fan does not bind the bearing, a condition which is apt to occur with plain bearings.

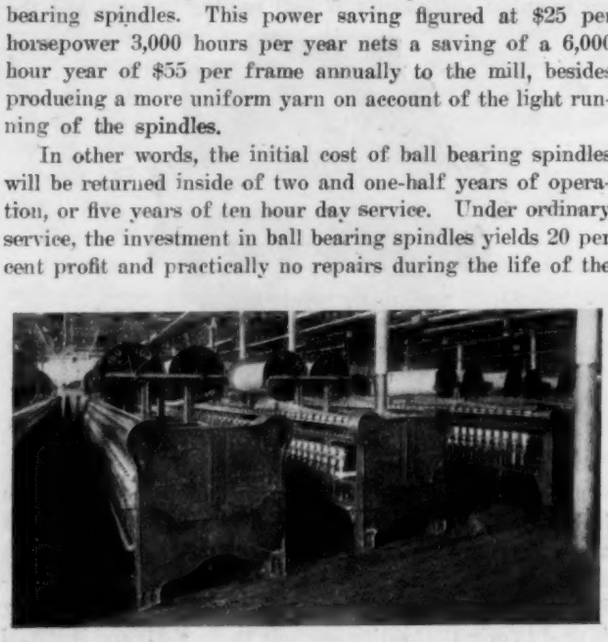


FIG. 9. 132.—SPINDLE FRAME WITH BALL BEARING TWISTER SPINDLES WHICH HAS BEEN IN OPERATION FOR A PERIOD EQUIVALENT TO MORE THAN FIVE YEARS.

In addition to removing all operating troubles and reducing the fire hazard, the use of ball bearings undoubtedly lowers to a very large extent the power wasted in friction.

ELECTRIC MOTORS.

The use of ball bearing for electric motors is proving to be an ever growing application for the reason that the requirements in textile mills are such that ball bearings seem especially adapted for this service. There is always danger from fire in textile mills where there is frequently an accumulation of oil-soaked lint around a leaky bearing, and added to this is a possibility of ruining fabrics from dripping oil. In the individual ceiling motor drive or the four frame drive where direct connected motors are employed,

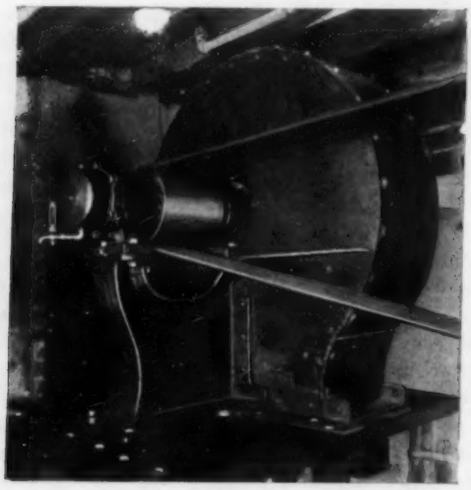


FIG. 10. EXHAUST FAN INSTALLED IN JUTE MILL.

the possibilities of dripping oil are a constant menace unless the bearings can be sealed against leakage.

The ball bearings are contained in compact housings which are sealed on either side by close fitting bearing caps. These caps form liberal lubricant chambers around the ball bearings. The bearings are positive self lubricators without any auxiliary oiling devices, and the close fitting caps next to the shaft insure the retention of the lubricant and therefore the prevention of oil leakage along the shaft.

HANGERS.

The cost of power to make a textile product is usually 10 per cent of the selling price. A saving of 25 per cent by the use of ball bearing transmissions, (which saving has been exceeded in many instances) will reduce the production cost 2½ per cent including the interest on the ball bearing investment. A reduction of 2½ per cent in the manufacturing cost is a matter worthy of careful consideration and points the way towards future reductions in selling price.

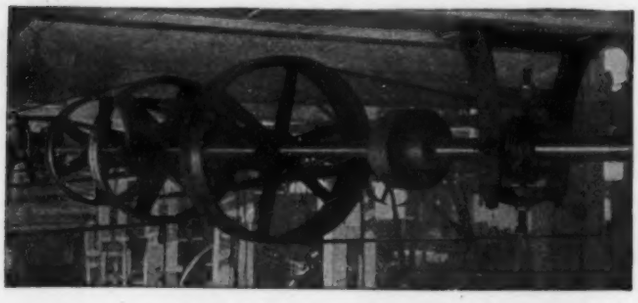


FIG. 11. SHAFT, SHOWING APPLICATION OF BALL BEARING HANGER.

In March, 1914, a paper presented before the American Society of Mechanical Engineers showed by comparative tests the following relative amounts of power consumed in friction in three types of hangers.

	100 Ft. per min.		300 Ft. per min.	
	77 Deg.	100 Deg.	77 Deg.	100 Deg.
Ball bearing hanger	1	1	1	1
Roller bearing hanger	2.2	2.5	2.7	3
Babb't bearing hanger	3	3.6	4.5	4

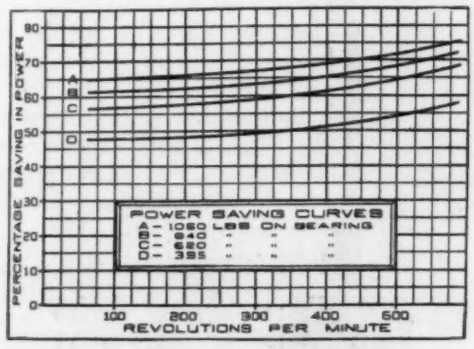


FIG. 12. POWER SAVING CURVES.

This table shows the relative amounts of power consumed in friction by the three kinds of bearings at the speeds and temperatures indicated.

From tests made on long lines of shafting mounted, first in ring-oiled babbitt bearings and second in self-aligning ball bearings, readings were taken of the power consumed by the bearings and the curves shown in Fig. 12 were plotted. By reference to these curves, it will be seen what the power saving amounts to. In the case of the substitution of ball bearings on a shaft running at 200 revolutions per minute, under an average load of 395 pounds per bearing, the power saving on curve "D" is equal to 48 per cent. This 48 per cent is the reduction in the power consumed by a bearing of the ordinary sleeve type.

It is a well known fact that many English cotton mills use complete equipments of ball bearing hangers and the

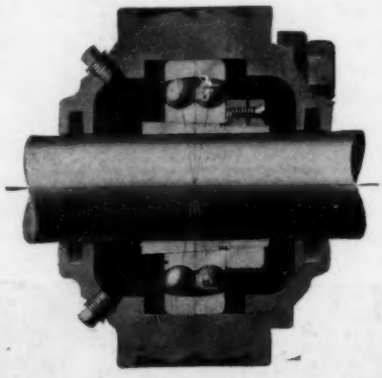


FIG. 13. SECTIONAL VIEW OF HANGER BOX MOUNTED ON SHAFT.

number of New England cotton mills following this example is increasing. Because of the lubricant saving, cleanliness and reduced fire hazard, they commend themselves to the mill superintendent. The ball bearing for these hangers is readily understood by referring to Fig. 13. An adapter bearing is used to grip the bearing securely to the shaft and it should be noted that no rotating bearing parts touch the shaft. The casing surrounding the bearing has but one removal cover

with plugs on top and in the bottom for refilling and draining of the large lubricant chamber. Provision against leakage of the lubricant and intrusion of dirt is effected by a groove and felt washer on each side of the bearing.

From over 500 installations operating in this country at the present time, the following figures might be taken as representing average conditions.

Total number of hangers	110
Frictional loss due to plain bearings	43 H. P.
Cost of electrical current per kilowatt hour	1½ cents
Cost to operate plant for 50 week year with plain bearing hangers	$4,203.75
Cost to operate plant for 50-week year, with ball bearing hangers	3,363.00
Savngs secured by using ball bearing hangers	25 H. P.
Power saving through the use of ball bearing hangers	840.75
Total cost of installation including hangers and erection	1,208.00
Interest on investment at 6 per cent	72.48
Depreciation, estimating 4 per cent	48.72
Total cost first year	1,329.20
Saving in maintenance	61.75
Saving in lubricant	64.00
Total saving	966.00
Total saving first year	966.00

Time required for the investment to pay for itself, 16 months, or about 75 per cent return on the investment.

On the question of life of these bearings for hanger use and how long they will operate, a definite answer cannot be given beyond stating that they have been used for this work for over eight years and if appearances count for anything after an examination of the bearings it would appear that they were good for at least seven or eight years more.

A New Transparent Material.

TRANSLATED BY ERNEST STUTZ.

Zeitschrift fuer Deutsche Ingenieure calls attention to a new transparent material a product of synthetic chemistry made from cellulose acetate and called "Zellon." It is made in the form of plates and can be manufactured of any desired thickness. Its essential characteristics are transparency and invisibility. It is claimed that in it are combined some of the most useful properties of glass, celluloid, India rubber and gelatine without their faults.

Of glass it has the clearness but not the brittleness; of celluloid the pliability but not the inflammability; of India rubber the toughness but not the defect of destructibility through contact with benzine, benzol, petroleum or oil of turpentine. It resists water also better than does gelatine.

The danger of fire has prevented the application of celluloid as windows for automobiles except for small panes. Zellon on the other hand, being capable of manufacture in varying thicknesses, can be made into windshields, windows of any size and is even recommended for skylights in automobile roofs. Its mechanical strength can be increased by wiring in the same way as wire glass.

In point of economy of manufacture it is worth noting that while celluloid is made from nitric acid, zellon is made from acetic acid, the supply of which at the present time is not monopolized for other purposes.

The invisibility of zellon is said to make it valuable for military aeronautics. Whilst most observations are now made from an altitude of 5000 to 6500 feet, the wings of an aeroplane made of zellon are said to be invisible at an altitude of 2500 to 3000 feet, leaving only the propellor, motor and passengers as a possible and rather indistinct target.

Perhaps we may hear more of this material shortly from France where the process of production is said to have been cheapened and where an aeroplane of the Moreau type equipped with it was shown at the aeronautical exposition at Paris in 1914.

A Few Words About Cuba.*

BY ERNEST HELLER.

Cuba, the Pearl of the Antilles, the land of perpetual sunshine and flowers, now is enjoying the peace and prosperity that after her long struggles are at last due her. True it is that here the American influence is stronger than in other Latin-American countries I have visited, but it is not as strong as is the due of the great Republic. But in the nature of all things it is growing, and here more than anywhere else outside of the United States its influence is gaining. The effect of the new is gradually supplanting the old and the contrast is strong.

Here one sees it to a marked degree: Ox carts and high power automobiles; burros and magnificent horses; men with alpargatas (duck shoes with cord soles), and women with the latest style shoes; mantillas and paradise plumes; narrow streets and wide boulevards; magnificent houses and squalid structures vying with each other in marked contrast; open air restaurants and latest sanitary appliances; motion pictures and cock fights; a liberal Sunday with everyone on the streets and music in profusion, are but some of the things one notices. With the tropical weather this wonderful soil needs but to be scratched and things grow in profusion.

Havana, the capital, is a city of about 325,000 inhabitants, and is the metropolis of the Island of Cuba, in area about the size of the state of Ohio, and totaling about 2,500,000 population. These come from all parts of the world. There are native-born Cubans, families of some of these having been on the island for several centuries; Spaniards, who are for the most part the merchants; Americans, also merchants; engineers and developers of the various projects; English, Germans, French, Austrians, Canadians, Turks, Chinese, Japanese; in fact, there is hardly a nation that is not represented.

The principal industry is agriculture, sugar and tobacco being the great staples. The sugar crop is normally about 2½ million tons, worth about 125 million dollars. The tobacco exports amount to $149,511,200, with leaf tobacco and cigars being exported. Of this, a large part goes to the United States, as does practically all the sugar, but the famous Habana cigars are known as the best product of this industry all over the world. In the fiscal year 1913 the trade of Cuba amounted to $308,952,000, of which the exports amounted to $165,125,000, the imports to $143,827,000, and the balance in favor of the Republic was $21,298,-

*Extracts from a paper presented at the Fourteenth Annual Meeting of the Alumni Association of the Philadelphia Textile School. All rights reserved.

000. The trade of Cuba per capita is greater than that of any other country in North and South America. It was in the year mentioned $123 per capita.

The business customs also show the strange admixture of the old and the new. On the retail streets one sees modern glass fronts displaying merchandise, and adjoining are old-fashioned stores with no windows, but with large rolling doors that open the entire store to view. Goods arranged with an idea to display and then others with all the goods in boxes and little else to be seen but the boxes. The goods shown are the production of all the world. While the United States has a preferential duty of about 20 per cent, English piece goods, French perfumery, German toys and novelties, Spanish laces, Italian umbrellas and ties, Chinese and Japanese goods of every sort are to be seen. Not always is it a question of price that this is so, for, while price is an important factor, it is not the only one. The people that have money to spend know about what they want, and are willing to pay for it. The styles are for the most part copied from Paris for the women's goods, and from London for the men's.

While my business was with both the wholesalers and the retailers, I found that with the goods of the greatest consumption, which naturally the wholesalers buy, there is no objection to buying goods from the States after the houses have proven themselves as being worthy of the confidence and act, as they say here, *"Serio."* This is a great word and expresses what the American manufacturer misses in so many cases. While we can make the best goods, in many lines, that can be made anywhere, where the manufacturer will not use the methods that are required here, he cannot gain trade or confidence. It is not all talk that one reads in the newspapers about the indifference as to packing and billing. The trade needs certain things that are troublesome, but with a little care and study they are easily learned, and, when they are done, aid not only the individual, but the entire trade of the country. Just a few instances of my own experience.

I take an order for three numbers from one house to be shipped together. As each item is completed it is billed up, although not shipped, and nine invoices sent to the customer, and when finally the goods are shipped no invoice is sent. The goods were held about six weeks, and, as they were sold on seventy days' terms, as soon as the time was up from the date of the first invoice a statement was sent, although the goods had not arrived here. Another firm sent the bills, as requested, to the express company or forwarding agent, but the commercial invoice that was requested to be sent direct when the goods were shipped would never be sent to the house here, as asked for; the house would not know anything about the shipment until the goods were delivered, even then they would not have any invoice, for those sent to the forwarder are retained at the custom house. Another time a customer made a remittance and at the same time wrote a very polite letter, explaining the delay in the payment. The letter was not acknowledged or answered, but a receipt was sent. A letter would not have taken much time or effort, but, no notice being taken of it, made the customer feel that his account was not a desirable one for the manufacturer, and he is one of the largest and best here. These instances could be enumerated indefinitely and they make the life of a salesman anything but easy, particularly when it takes ten days for a letter to go to the States before a reply is received.

As to the business methods or customs, they are also a strange mixture. The principal dry goods merchants with whom I work are Spaniards or Americans. While in a great many of their houses there is some one who talks English, Spanish is most important. The merchants are for the most part serious and honorable. While sometimes the payments are long delayed, there are few failures. They are keen at driving a bargain, but once the bargain is made they live up to the provisions. In the old-established houses there are still in force some of the old customs. All the employees living in or above the store, eating in the store, using one common table, proprietor, clerks, salesmen, porters, etc., and any visiting merchant who may happen to be in the store at the time is invited to join them.

This peculiar condition has given rise to the formation of the large and various clubs or centers here, which are unique inasmuch as they do not exist in other parts of the world. Some of these *Centros* have as many as twenty-five to forty thousand members, each paying about one dollar and a-half a month. They have wonderful club houses and each maintains a hospital. In the club houses are gymnasiums, billiard and chess and checker tables, class rooms for all manner of studies, and a large ball room. Dancing is a favorite diversion, and the dance room of the *Dependientes,* one of these clubs, having about 25,000 members, can accommodate some six thousand people dancing. The hospital maintained by this association is modern in every respect. I was unfortunate enough to occupy a bed there for some three weeks, but the attention and service left nothing to be asked for. The doctors are of the best, the food good, so much so that after feeding me for nearly a week on chicken twice a day, I asked for commoner food. Baths of all kinds and electric treatment, surgical attendance, dentist and legal advice are also given, and all this for the one charge of a dollar and a-half a month.

The clerks and all the help, in fact, are for the most part living in the business places, and in some do not go out more than once or twice a month. They draw a very small wage, leaving the balance with the house; some interest is paid them when the amount is sufficient. An industrious clerk works his way up, and when he has accumulated a few thousand dollars is given an interest in the profits, later receiving an interest in the business, until finally the original owner retires from active management, leaving some capital in the business and returns to Spain, making occasional visits. This is the reason that some of the old names are retained, even though none of the original owners are still in the business. Another odd custom is for each store to have a name as "The Key," "The Golden Bow," "The Scissors," etc. The American merchants have also adopted this, and "The American Flag," "The American Eagle," "The American Style" are some of these.

To go into the various lines of manufacture in a short article is quite impossible. Practically all the goods that can be bought in the States can be had here; true there are some that are not shown in such a great variety, but all staple goods are offered and from all the countries. It seemed strange to me to see beautiful Turkish towels in jacquard designs brought from Spain, and cheap cotton piece goods made of American cotton from Italy and Spain. Bed spreads and table covers as made in large quantities in Philadelphia, come from Belgium, Spain and Italy. Men's collars are or were imported in very large quantities

from Austria and England, although now the Arrow collar people are getting a good share of the trade. This they did only after they used the same aggressive campaigns in advertising that they did in the States. B. V. D. is also well and favorably known, to say nothing of the Stetson hats or Onyx hosiery, Warner's corsets, Regal shoes, Manhattan shirts, Sweet-Orr pants, Paris and Boston garters, President suspenders, Hart, Schaffner & Marx clothing, which are all ready sellers.

In the hardware and foodstuff lines there are also many well and favorably known. The big packing houses have branch establishments here; one has the finest horses they can obtain for their trucks, while another has all great big powerful mules, and as they come along the streets they always attract attention.

The transportation facilities in the city are very good. There is an electric car line, 5 cents American or 7 cents Spanish fare, a line of mule busses at 3 cents Spanish, and cabs at 10 cents and 20 cents Spanish a trip within certain limits in the city. There has also lately been established a line of Ford taxicabs at 20 cents a trip. The money used is American, which is the official money of the country; Spanish silver and gold and French gold. These vary day by day, American money running from 1 to 10 per cent more than Spanish silver or fractional money. The Cuban Government is about to issue a coinage of its own. The metal currency is now being made at the Mint in Philadelphia.

Directions for Firing Soft Coal.

"Hand Firing Soft Coal Under Power-Plant Boilers," is the title of Technical Paper 80 issued by the United States Bureau of Mines, as an aid to the firemen employed in manufacturing establishments throughout the United States.

The paper, which contains descriptions of methods of firing soft coal under power plant boilers and of methods of handling fire so as to have the least smoke and to get the most heat from the fuel, seeks to meet the needs of the men, many without a technical education, who are employed in small plants of 1,000 to 2,000 horsepower capacity. For this reason the language used is plain and simple, and technical terms have been avoided as far as possible. An extract follows which will show the value of this publication to cotton manufacturers for the use of their power plant men:

"When burning bituminous coal under power plant boilers the best results are obtained if the fires are kept level and rather thin. The best thickness of the fires is four to ten inches, depending on the character of the coal and the strength of draft. The coal should be fired in small quantities and at short intervals. The fuel bed should be kept level and in good condition by spreading the fresh coal only over the thin places where the coal tends to burn away and leave the grate bare.

"Leveling or disturbing the fuel bed in any way should be avoided as much as possible; it means more work for the fireman and is apt to cause the formation of troublesome clinker. Furthermore, while the fireman is leveling the fires a large excess of air enters the furnace, and this excess of air impairs good efficiency.

"The ash-pit door should be kept open. A large accumulation in the ash-pit should be avoided, as it may cause an uneven distribution of air under the grate. Whenever a coal shows a tendency to clinker, water should be kept in the ash pit. All regulation of draft should be done with damper and not with the ash-pit doors.

"In firing, the fireman should place the coal on the thin spots of the fuel bed. Thin and thick spots will occur even with the most careful firing, because the coal never burns at a uniform rate over the entire grate area. In places where the air flows freely through the fuel bed the coal burns faster than in places where the flow of air is less. The cause of this variation in the flow of air through the different parts of the fuel bed may be differences in the size of coal, accumulations of clinker, or the fusing of the coal to a hard crust. Where the coal burns rapidly, the thin places form.

"Before throwing the fresh coal into the furnace the fireman should take a quick look at the fuel bed and note the thin spots. In a well-kept fire these spots can be usually recognized by the bright hot flame. The thick places have either a sluggish smoky flame or none at all. In order to place the coal over the thin places the fireman should take a rather small quantity of coal on his scoop, for it is much easier to place the coal where it is needed with small shovelfuls than with large ones.

"The coal should be placed on the thin places in rather thin layers. If the fireman attempts to fill up the deep hollows in the fuel bed at one firing, the freshly fired coal may fuse into a hard crust thus choking the flow of air, causing the fuel to burn slowly and starting new high places. If the high places in the fuel bed are missed on one or two firings the hard crust at the surface will gradually burn through or crack, thus allowing more air to flow through, and the place will get back to its normal condition. Of course, if the high place in the fuel bed is caused by clinker the flow of air will not be free until the clinker is removed with the fire tool. Whatever may be the cause of the high places in the fuel bed, the fireman should remember that they are places where the coal does not burn. There is no use in placing coal on such a spot.

"If the firing is too far apart the coal in the thin spots may burn out entirely, allowing a large excess of air to enter the furnace in streams. If those streams of air are not properly mixed with the gases from the coal, only a small percentage of the air is used for combustion, and most of it passes out of the furnace, depriving the boiler of considerable heat. If, for instance, air enters the furnace at atmospheric temperature, say 75 degrees F., and leaves the boiler at about 575 degrees F., it carries away the heat that was absorbed in raising its temperature 500 degrees. This heat is lost to the boiler. Another loss of heat occurs when holes form in the fuel bed, because pieces of unburned coal fall through the grate when the fireman attempts to cover the holes with fresh coal. Therefore, in order to avoid the formation of holes, firings should be made at short intervals, particularly if, for any reason, the fuel bed must be kept thin."

Copies of Technical Paper 80 may be obtained by addressing the Director of the Bureau of Mines, Washington, D. C.

You can keep a cow alive on potato peelings but she won't give any milk, and when a cow stops giving milk her mission in life is at an end. You don't keep cows for company.

Mill Conditions and Market Reviews.

Southern Mill Situation.

The business outlook in the South, as elsewhere, is improving daily, and there is every indication of a permanent return to normal conditions. The successful placing of the big loan, the high price of cotton, and corresponding rise in the price of yarn are factors of great importance. Our difficulties with Germany appear to be practically settled, and considering the disappearance of many doubts which had weighed heavily upon the public mind for months, the outlook may be regarded as most assuring. Mill men talked with recently all feel convinced that we have turned the corner, and business has finally adjusted itself to the new conditions brought about by the European disturbances. People generally are more optimistic. This situation is very noticeable and pronounced. Undoubtedly, the early future of this country promises a period of prosperity resulting from renewed internal development, as well as from a larger share in the world's trade. Manufacturers say that there is every indication of a very active autumn and winter business in textiles. With a very much smaller crop of cotton, and with a market price nearly double that of last November, the South is very far from that buy-a-bale period and needs no help from the federal treasury.

In an interview with COL. LEROY SPRINGS, president of the string of cotton mills at Lancaster, Kershaw, Fort Mill and Chester, South Carolina, he stated that the reported shortage of the cotton crop is unquestionably true, and that it looks as if the crop will be considerably under twelve million bales. He thinks the farmers are in better position to hold their crop this year than they have been in several years, owing to the fact that they have made this crop very cheaply, due to the small amount of fertilizer used. He stated that he does not believe cotton will sell for much under 12 cents this season, and this price will only be temporary, and that consequently mills will have to get better prices for their goods. Col. Springs said that the recent heavy demand for goods in both colored and grey goods indicated that it would only be a short time until the manufactured goods would be on a parity with cotton, and it would then be a question of supply and demand. "There is a smaller amount of goods in the hands of the mills and with the jobbers and on the shelves of the retailers," he said, "than there has been in years, owing to the past year's depressed conditions in all textiles.

"The small crop of cotton that is being raised and the active demand for it, has put new life into the textile business, and I expect to see goods go much higher, and I anticipate that there will be an active demand for all goods that southern mills can make, irrespective of the shortage of dyestuffs.

"The manufacturers of colored goods are now, more than ever before, feeling the effects of dye shortage, and it is only a question of a few months before they will have to close down unless something is done. The consuming public will simply have to use bleached goods until dyestuffs are more reasonable and plentiful.

"While practically all kinds of cotton fabrics have advanced from 3 to 5 cents a pound recently, there is every indication that we will have a larger trade and a further advance and an active demand for all classes of goods. It is up to the mills," declared Col. Springs, "to discontinue taking orders for goods at prices lower than they can be made for and demand a reasonable profit on their manufactured goods.

"The print cloth mills of today are making no money, based on the present price of cotton, nor will they as long as they continue to sell for future delivery. Although there does not seem to be a large amount of print cloth on the market at the present time, the print cloth mills cannot expect to obtain a reasonable profit on goods as long as they sell ahead at the same prices they are getting for spot goods, because they are really selling at prices lower than the cost of manufacture, and unless they can get better prices it is very evident as to the outcome.

"I have noticed that stocks and cotton always advance before textiles," said Col. Springs. "Textiles are always the last to advance, but it looks as if they are now coming into their own. I do not believe that the tariff situation at the present time, or in the near future, effects or will effect the textile industry of this country. The foreign manufacturers are too busy manufacturing ammunition and taking care of their own people to offer any competition. But when this war ends, the manufacture of the finer counts of cloth will be very seriously menaced, and this country will have to go back to the McKinley tariff."

In regard to the Palmer-Owen Child Labor Bill, he said: "I think that it is very unnecessary, because it will work a fearful hardship on mill operatives, to say nothing of the position in which it will place the southern manufacturers. I think that it is a bill which was drafted probably with good intentions, but without any information or understanding of the situation. And besides the present state laws are enough to take care of the situation, and if there is to be a national law along these lines, Iwould say that compulsory education is the key to the situation. Make it a national law, or get a state law to force school attendance and then the Child Labor question will take care of itself, for in this way the people will be given advantages that will better prepare them for their future occupations, and they will be benefited more in this way than by any labor laws that could possibly be passed. The people concerned, the mill operatives, are all a working class of people, and they depend on their work for a living and I think that the best thing, the most sensible thing, to do is to give them plenty of work and reasonable pay, and I believe that if one of their members could be put in the legislature, that they would not support these bills themselves. They would know the situation and would do the best thing for the people, and consequently do the reasonable thing. The mill people are not in favor of these bills, because they realize the conditions it would bring about, not only among themselves, but among manufacturers. You cannot cripple the employer without hurting the employee. I think that all mill people should get together, mill owners as well as mill

operatives, and do something definite to stop the passage of this bill."

In an interview with PRESIDENT Z. F. WRIGHT, of the Newberry Cotton Mills at Newberry, S. C., he stated in reference to the Palmer-Owen Child Labor Bill that he thought it would hurt the mill operatives more than it would the mill owners. A bill of this character always goes to extremes and he said he was sure that if the people urging the passage of this bill could see the conditions as they really are that the bill would not pass. Ignorance of the true conditions, he declared, was nearly always the controlling factor in the passing of unsound legislation whether state or national.

New mills, additions and enlargements to existing plants either contemplated or contracted for are noted as follows:

Arrangements have been completed by the Republic Cotton Mills, of Great Falls, S. C., to double their plant and its output. The capital stock has recently been increased from $600,000 to $1,200,000, all paid-in and all common stock.

The announcement of the doubling of this plant has created wide interest in textile circles throughout the South. The original plant of the Republic Cotton Mills was built about four or five years ago, and it is said that the contemplated addition now is but one of many units which will be added to this plant. The new plant will be handsome and modern and will have 40,000 spindles and 1,000 looms. Three hundred new cottages for operatives will be added and a welfare house will be provided. The Republic Mill has been particularly successful, quarterly dividends having been paid almost ever since the enterprise was launched. This mill now has 27,000 spindles and 650 looms, which are operated by electric power. A fine grade of yarns is manufactured, print cloths being made. Work will be begun on the new plant as soon as possible.

The Bibb Mfg. Company, Macon, Georgia, are placing orders for a large amount of new machinery for their Columbus mill.

The Abingdon Mills, Huntsville, Ala., has recently invested about $100,000 in new machinery from pickers to spinning. N. C. Roe is agent at this mill, which manufactures ducks and drills.

The Cowikee Mills, Eufaula, Ala., have just added six new speeders and 20 new spinning frames of Saco-Lowell make.

The Franklin Mills at Greer, S. C., have recently installed 29 Draper looms and a new warp tieing machine. They report business good and plenty of orders.

The Chiquola Mfg. Co., at Honea Path, S. C., have recently repainted the mill and repainted and recovered all the operatives' houses in the village.

The Grendel Mills No. 1 at Greenwood, S. C., is doing a number of general repairs in the mill and village, repainting, etc.

The Grendel Mill No. 2 at Greenwood, S. C., have been conducting some extensive tests in regard to power and economy, and as a result have increased production and cut down overhead expenses largely. Mr. McKissick has been giving this work his personal attention. He is a graduate of Auburn Polytechnic Institute and much interested in matters of this character. It is also of interest to note that the mill schools in connection with these mills operate nine months in the year.

The Kershaw Cotton Mills at Kershaw, S. C., have added the following new machinery to their equipment: one picker, one intermediate roving frame, two jack frames, four spinning frames, one spooler and twenty-eight Draper automatic looms. They will also put in a new feed water pump, but at the time of going to press this has not been purchased. Another point of particular interest at this mill is a new waste house which they have recently completed and which is divided into eight different sections or parts, each for a separate kind of waste. This keeps the waste separated and there is no opportunity for accidental mixing. In this manner the waste can be handled cheaper and much more conveniently.

The Hermitage Mills at Camden, S. C., have just installed a new 600 h. p. Kerr Turbine. They are also repainting and recovering the mill village.

The Pine Creek Mills at Camden, S. C., is installing a complete new boiler plant consisting of three 250 h. p. Manning type, Dillon boilers, and a new smoke stack 120 feet high. Business is reported good at this mill and it is running night and day.

At the Greenwood Cotton Mill, Greenwood, S. C., business was found to be good and a general overhauling of the mill and village in progress. A 50,000 gallon tank is being remodeled and improved.

The Mollohon Mfg. Co., Newberry, S. C., are building a new smoke stack and making general improvements around the mill and village.

The Gaffney Mfg. Co., at Gaffney, S. C., are repainting and doing general repairs around the mill and village, including the recovering of all the operatives' houses.

The Irene Mills at Gaffney, S. C., are building a bleachery 265 feet by 170½ feet one story and basement. They are equipping this bleachery with all the latest machinery especially adapted to bleaching wide damasks, 76 inches and wider. The water will be supplied by four artesian wells, two of which are finished. The finishing department of this bleachery has hardwood floors throughout. They have three large kiers and six concrete vats for bleaching solutions, as well as other necessary machinery, all of which will be electrically driven.

Tucapau Mills at Tucapau, S. C., are installing two new 250 horsepower boilers and expect to build ten new operatives' houses in the village within the next 60 days.

The Inman Mills at Inman, S. C., have inaugurated a new idea in the form of a little paper known as the "Inman Mills Exchange." This contains local features of interest and carries items on the increased production secured by certain operatives and sub-foremen and other items of especial interest to the mill people. This paper has shown its publishers that it is interesting their operatives in matters of a technical nature and causing them to read and think more, than before the publication was put in the field. It is also of interest to note in this connection that the Lanett Cotton Mills, at West Point, Ga., are issuing a similar publication at their plant with equally as good results.

The Wallace Plant of the Victor Mfg. Co., at Jonesville, S. C., have been overhauling all machinery and reclothing several cards. This mill expects to put a street lighting system in operation in its village within the next few weeks.

The Monarch Cotton Mills at Union, S. C., have recently

installed 5,000 spindles. This mill has also built 50 new barns for the operatives' cattle, which are very complete and up-to-date. They recently held a fair, the object of which was to better the condition of the people and the village.

The Chesnee Mills at Chesnee, S. C., have just repaired all the operatives' houses.

The Woodruff Cotton Mills at Woodruff, S. C., are building eight new operatives' houses. A night school has been started at this mill for the benefit of the operatives. Arrangements have just been completed for lighting the operatives' houses in the mill village and within the near future they expect to install water works in the village and equip each house with a bath room. The plans for this work have already been made.

At the Wylie Plant of the Hampton Cotton Mills Co., at Chester, S. C., they are overhauling, repainting and recovering all the houses in the mill village. They are also putting in a new sewage system in connection with the mill.

The Eureka Cotton Mills at Chester have just completed repainting and general repairing around the mill and village.

The newly organized cotton mill company at Belmont, N. C., has been chartered as the Climax Spinning Co., with $300,000 capital authorized and $100,000 subscribed. This plant will manufacture yarns and will also weave cloth from cotton, wool, flax and jute.

The Efird Mfg. Co., Albemarle, N. C., one of the "Cannon" mills, will build an additional mill to contain about 17,500 spindles. Machinery and equipment has been bought and will be delivered early in the new year.

The Wiscassett Mills Co., also of Albemarle, will build an additional mill, installing about 17,500 new spindles and other equipment, all of which has been contracted for.

Charles Page, of Tulsa, Okla., and associates, are interested in the organization and establishment of a mill at Sand Springs. He states that local interests are willing to subscribe from one-half to one-third of the required capital for such a plant, up to $500,000. He also states that Sand Springs is willing to give a free site for such a mill.

Contracts for the new Fairfax Mill of the West Point Mfg. Co., West Point, Ga., have all been placed. The Machinery will include 25,000 spindles, and will employ about 500 operatives. The new mill will be located at Fairfax, Alabama, near West Point. The new building is expected to be completed by January, and machinery installations will be made during February.

Building operations have begun on the new plant of the Hogansville Mfg. Co., Hogansville, Georgia, and it is expected to be ready for the installation of machinery early in the year. The machinery for the addition will include about 5,000 spindles, and will employ about 140 operatives.

W. J. McGill and J. D. Hutton, of Shelbyville, Tennessee, are concluding their plans for the formal organization of the Valley Cotton Mills. Plans and specifications are now being prepared.

The Sterling Spinning Co., Louisville, Ky., is planning the addition of considerable new machinery. They now have an equipment of 1,224 spindles.

W. H. Childrey, of Haw River, N. C., is organizing the Childrey Hosiery Mills, with capital stock of $5,000. He is planning for a daily capacity of 1,200 pairs of men's fine gauze hose.

H. M. Clark, of Bowersville, Ga., is considering the establishment of a small knitting mill at that point.

H. P. Smith, Keener, Ala., is interested in the establishment of a cotton-twine mill at Alabama City

The Viola-Mae Cotton Mills, Gadsden, Alabama, is being organized. James Riddle is president, and Chas. L. Manning, secretary.

The new plant of the General Asbestos & Rubber Co., at North Charleston, S. C., has been completed. The present plant will be discontinued. These people manufacture asbestos yarns and cloth, including tape and banding.

The Forsyth Cotton Mills, Forsyth, Georgia, will resume operations about the first of November. This is a reorganization of the old Star Cotton Mills. A large quantity of new equipment is being installed to replace old machinery, and will put this plant in first-class condition.

Arrangements have been completed for the establishment of the knitting mill which Brown Cornelison, of Oklahoma City, has been organizing. A suitable building has been leased and will be remodeled to suit the purposes of the proposed plant. The equipment consists of 84 knitting machines, loopers, finishers, etc.

Building operations have been started on the mill for the Grey Hosiery Mills, at Hendersonville, N. C. The owners are James P. Grey, Sr., and James P. Grey, Jr., of Johnson City, Tenn. They expect to begin manufacturing misses' seamless hosiery about January 1st.

New England Mill Situation.

There is work enough for the cotton mills and only dyestuff scarcity and labor troubles prevent a full operation of about every factory in condition to run. The mills are steadily exhausting their dyestuff supplies and from week to week notices are being sent out of withdrawals of various shades in yarn mills, finishing plants, dye concerns and print works. The gingham mills have been forced to revise many orders and to ask buyers to accept some patterns in which so many colors are not used. Constant progress is being made in the use of new dyes of many kinds and many goods are being sold on which past guarantees of color fastness are not attached.

Uneasiness in labor circles is being watched closely. A strike resulted in the closing of the large blanket mills at Nashua, and New Bedford operatives are beginning an agitation for an advance in wages. Delegates representing the I. W. W. have appeared in various centers and they are trying to stir up trouble. Textile operatives are none too plentiful because of the drain made by other industries, and because of the changed tide of immigrants. Many are going to Europe to engage in fighting there, and the number coming this way has dwindled to small proportions.

The activity in cotton mill machinery shops is very great. The Draper Company has more orders ahead for automatic looms than ever before, and all the large concerns have substantial orders in hand for new carding, spinning, and finishing machinery of all kinds. The cost of machinery has jumped up, as a consequence of the rise in metals and the very great demand for machinist labor.

The fine cotton goods industry has never been so well employed. In fact, the large additions that were made in 1909 were not called for until this year The yarn industry in particular has struck a pace not paralleled in the recent

history of the industry. Owing to the scarcity of fast dyes some of the colored yarn mills have already withdrawn offerings and will only complete the orders they have in hand. The demands for combed yarns, in coarse and fine numbers, has been very large and has not only served to clean up most stocks, but has led to the placing of contracts that will run for months into next year.

Some of the Fall River and New Bedford fine goods mills are running nights trying to fill orders that have come in excess of their ability to meet spring requirements. The great dearth of very fine yarns is due to the fact that mills organized for the very fine numbers have recently been used on many numbers under 60's. Manufacturers have not been willing to spin the finer numbers at the prices offered. Now that the trade is calling for yarns above 60's many mills are forced to run their carding or fine spinning plants overtime.

While there has been a good demand for the medium count fine combed yarns, there has also been an unprecedented demand for coarse combed yarns and for the numbers above 80's. Tire duck yarns have been in broad and active demand. There has also been a good call for certain of the very fine qualities of dyed yarns to meet the growing call in the markets for the choice fine yarn dyed fabrics that have not been selling well for some years until the current season. There is also a good demand for heavy yarns due to the use of skirting materials in larger quantities than usual.

The demand for print cloth yarn goods has been active. Prices are substantially higher than they were a month or six weeks ago yet mills at Fall River have been slow sellers. They are still carrying stocks approximating 2,000,000 pieces of odd cloths and have been refusing offers for them made on a basis of 11 cent cotton or slightly higher. The mills are not well provided with cotton. On the contrary, many of them are buying from week to week and trying to average up with the light supplies of cheap cotton many of them have to last until January.

Manufacturers as a whole were not believers in high cotton prices. Most of them had an idea that 10-cent cotton would be the limit. They followed their beliefs to the extent of buying little or nothing on the rise and even if current cloth prices are maintained they will not make much money out of the present crop. There has been a resumption of dividends among many of the fine goods mills but the other concerns, as a rule, are not making money in a volume that will assist them in averaging up their dividends passed in the last few years of depression.

The large printers of staple goods, such as the American and Algonquin works, have booked a very large business on narrow prints, percales, and robes. They are supplied with dyes to take care of the orders they have in hand, but are now forcing restrictions upon buyers, either through higher prices, or through refusals to accept many of the styles asked for in dark-colored work. Wherever it is possible they are urging buyers to use the lighter shades of cloths so that fast dyes may be conserved to as late a day as possible. The fine goods printers are very busy but are not as well engaged for a long run as the coarser goods concerns.

They have been getting better repeat orders from converters and jobbers in the past month and if the reorders were large they would feel better satisfied with the outlook. In many of the very fine qualities of printed goods the restrictions on the supplies of modish colors are limiting sales a great deal. The business taken on fine fancy prints has not been up to the volume of a year ago but last season developed late and most printers expect to see a similar development for the coming spring season.

Bleached goods, sheets, pillow cases, and other staple domestics have been in good demand, wide sheetings have been advanced 2 cents a yard, and 4-4 bleached cottons ½ cent a yard, since the first of the month. The bleacheries are very busy. The demand for white goods of all kinds has been exceedingly active and broad. Muslins, nainsooks, fine cambrics, lawns, linons, organdies, and longcloths have been called for in larger volume than for years past. There is also a very good call for all sorts of white fancies in voiles, piques, poplins, gabardines, and fancy skirting materials in basket weaves.

The cutters are looking forward to a big season in fine white waists and fine qualities of heavy white skirt materials, once the spring retailing season begins and the provisions made by many of them exceed anything known in recent years. The trend toward white is being encouraged as much as possible owing to the inability to secure colors for piece dyed materials. Dyed poplins are scarce and have been advanced sharply, and many other heavy fine piece dyed materials are being bought wherever found, on the theory that fast colors will be even scarcer later on.

The dress gingham fiasco has been cleared up considerably. Some of the large gingham mills have restored the prices of last season on all dress ginghams and will not make concessions to secure any further business. The orders taken by the Amoskeag Company at the cut prices were very large and the question of filling them has become a serious one because of dye scarcity. Staple ginghams have been in active demand and are quoted at value, on a basis of 6¼ cents. Tickings have also been placed at value, the last price being 11½ cents for 8 oz. goods. Colored denims, duck, and working suit materials are held much firmer, and mills are no longer frittering away their legitimate profits in cloths that cannot be replaced until America can make fast dyes, or until the wars end.

Considerable apprehension is expressed concerning the course of the market on napped goods for next season. It is clear that many dark colored lines of flannellettes will not be made, and many of the dark fancy blanket patterns will be cut out of the new lines. The demand for goods of this sort has been active, yet many goods were sold at low prices early in the course of the upward price movement. With cotton high, dyes high and scarce, and labor troubles pending, there is little reason to look for any low prices on napped goods for another season, and it is not believed that there will be any price reductions for the sake of securing business as there was in the gingham field. At the present moment it is stated that stocks of napped cottons in fast dyes are very small in first hands and no stocks of blankets will be carried over into the new season.

Quilts and bedspreads have been active at rising prices. There have also been sharp advances in all towelling and diapering lines, and in all sorts of table felts and heavy goods of a miscellaneous character. The hosiery and underwear mills have become very active and are now well sold ahead for the balance of this year. In several instances overtime is being run in hosiery mills, especially in the

fancy lines. The embroidery concerns have been doing only moderately well but all the lace manufacturers have had an excellent business. Those engaged on trimming laces are engaged for months ahead, and some of them making the finer grades of all-over laces are having the best business in their history. There has been a growing call for table damask in white and colors, many of the old looms on turkey red damask having been restarted after an idle period extending over many years.

While many of the New England manufacturers are making progress in securing export trade and are paying more attention to it than ever before, there is a feeling that with the broadening of domestic demand there will be less effort made to meet the requirements abroad. This is the chief difficulty in trying to develop export markets for the American mills and if it is allowed to make headway at this time it will be against the wishes of many manufacturers, especially those who have been cultivating South American markets in bleached and fine cottons as well as many lines of knit goods.

Cotton Comment.

BY H. & B. BEER, NEW ORLEANS.

New Orleans, October 20th, 1915.

A further advance of about $8 per bale has taken place the past month, making a rise in values of nearly $20 per bale during the past sixty days.

Instead of prospects improving, crop conditions generally have become worse, so much so that the New Orleans Times-Picayune in its monthly crop review of 18th inst., stated that an exceedingly sharp deterioration occurred since their September report, so that the present condition of the crop is, probably, the lowest of record.

We are not at all surprised to see the outlook for the crop so unpromising, as our advices have been generally unfavorable. We have laid particular stress on the fact that cotton seed is selling at the highest prices ever known in the interior, $33 to $50 per ton according to location, as there is no branch of the trade better informed on crop conditions than cotton seed oil people, who are on the ground, receive first hand information and are influenced by personal observations in the fields.

Strange to say, however, speculation has not been so rampant of late, due to the set-back the contract market received recently, which has served to make the public more cautious as regards over-trading.

Believing that there is the possibility of lower prices, European importers have bought only sparingly so far this season, but as their supplies are getting low, necessity will force them in the market in the near future.

On the other hand Southern spots are selling at the highest levels of the season, and there is no desire on the part of farmers to press their cotton for sale, even at the advance, as they are receiving as much money for their seed as they obtained for their cotton last year, besides the South has made large crops of grain, which has put them in good stead so far as finances are concerned.

Up to October 15th, 2,535,000 bales were marketed, against 1,600,000 last year and 3,349,000 year before last. From now on receipts will likely show up smaller than after this time one year ago and perhaps previous late years, as indications are that the crop will be under 12,000,000 bales, whereas last year it was about 17,000,000 bales.

Exports to Europe from the United States thus far this season total 1,062,000 bales compared with 334,000 to even date one year ago, and as the stock at all U. S. ports is large, 1,210,000 vs. 572,000 last year, we look for the export movement to increase, as the large stocks at the ports do not represent cotton shipped on consignment, but represents cotton in course of shipment to Europe. Very little business is done in cotton consigned, as the interior ships direct to Europe these days.

There was consumed in the United States during the month of September 498,000 bales of cotton vs. 415,000 during the corresponding month last year, and the quantity of linters consumed was 61,000 vs. 28,000 one year ago. Since August 1st, or for the first two months of the season, the mills of the United States consumed 963,000 bales against 799,000 during the same period one year ago, and in addition consumed 117,000 bales of linters vs, 53,000 for the first two months of last season.

England is consuming largely of cotton also, perhaps more than ever before owing to the filling of big French and British government contracts for war requirements.

Liverpool merchants are generally bearish, but not so this year, as their stocks are dwindling, and ocean freight and insurance rates are high, and as spots in the South are dear, there is much difficulty in replenishing reserves, except by meeting the market, which they are doing reluctantly.

In its weekly report of today, the government reports picking nearing completion in many sections of the belt, and where not nearly finished, picking is further advanced than usual. Whatever ginnings to October 18th may be, they are expected to represent about 60% of the crop, which indicates a very short crop.

The Yarn Market.

During the past month the yarn market has been what is technically known to the yarn dealers as a slow market. However, it is proving a very satisfactory market to the spinner, because prices are climbing steadily upward to points where the spinner is enabled to make a profit, even with the advancing price of the raw material which has had to be encountered.

As outlined in these columns during the past several months, knit goods buyers and others in the yarn market insisted on deferring their purchases until such time as the raw staple should go lower and merely bought in a hand-to-mouth manner sufficient to keep their mills in operation and their spot orders filled. Now, these mills are having to purchase yarns in the highest market of the year to fill orders which are coming onto their books with a greater rapidity than at any time for a long period.

Early in the month it became evident that southern spinners on two-ply yarns were well sold up, particularly on mercerizing twist. Eastern spinners did not seem to be as well supplied with contracts as did the southern spinners as in many instances prices quoted by them were lower. There was some good buying of carded cones by the knitters. There was little material change in the weaving situa-

tion at this time as it remained somewhat spotty. Later in the month the combed yarn situation improved and prices advanced while no prospect of a decline seemed to be in sight. On the contrary further advances were looked for.

Southern spinners were generally quoting single combed peeler on cones at 25 cents basis of 10's. Some, however, were asking 25½ cents for the same goods. Two-ply combed yarns are very firm and several mills selling direct have called in their salesmen as they do not care for any more business at the present prices, even though they are at a considerable advance over earlier prices. The prices on carded knitting yarns are also being advanced by the spinners. Coarse numbers of southern frame spun cones have been sold on the basis of 19 and 19¼ cents for 10's for small quantities. Sales of larger quantities of from 50,000 to 100,000 pounds for delivery extending over several months have been made on the basis of 19½ and 19¾ cents for 10's. Sales of 18's cones were made for 21 and 22 cents. 24's cones have sold for 22½ to 23½ cents.

In the weaving end prices of yarns are varying widely, but spinners are holding firmly to their quotations, especially on the fine yarns in which staple cotton is used. For example, 40's two-ply warps were sold at prices ranging from 32 to 37 cents. A sale of 60's two-ply carded warps were made at 49 cents in the New York market and the demand for 30's two-ply is greater than for any other number and spinners were quoting it at from 27 to 28½ cents.

Following are recent quotations on the Philadelphia market, although the variations are so many and so rapid that they will mean little by the time they reach the reader:

Southern Single Skeins.

8s	18 @19½	10s	19½ @20½
14s	20 @20½	16s	20½ @21
20s	21 @21½	24s	22½ @23
26s	23 @23½	30s	25½ @26

Southern Single Warps.

8s	18½ @19	10s	18½ @19
12s	19½ @20	14s	20 @21
16s	20½ @21	20s	21½ @22
24s	23 @23½	26s	23½ @24
30s	25½ @26½	40s	32 @36
50s	42 @44		

Carpet and Upholstery Yarns in Skeins.

8-4 slack	18½ @19	9-4 slack	19 @19½
8-3-4 hard twist	18 @18½		

Southern Two-Ply Skeins.

8s	18 @19	10s	19 @19½
12s	19½ @20	14s	20 @20½
16s	20½ @21½	20s	21½ @22½
24s	23 @23½	26s	23½ @24
30s	25½ @26	40s	32 @33

Southern Two-Ply Warps.

8s	19 @19½	10s	19½ @20
12s	20 @20½	14s	20½ @21
16s	21 @22	20s	22 @23
24s	23½ @24	26s	24 @24½
30s	26 @26½	40s	32 @36
50s	42 @44		

Northern Two-Ply Carded Peeler Skeins.

22s	25 @25½	26s	27 @27½
30s	28½ @29	36s	32 @33
40s	35 @36	50s	39 @41

Two-Ply Combed Peeler Skeins.

20s	28 @29	24s	30 @31
30s	35 @37	40s	40 @44
50s	48 @50	60s	53 @55
70s	59 @60	80s	69 @72

Southern Frame Spun Yarn on Cones.

8s	19 @19½	10s	19½ @20
12s	20 @20½	14s	20½ @21
16s	21 @21½	18s	21½ @22
20s	22 @22½	22s	22½ @23
24s	23 @23½	26s	23½ @24
30s	25 @26		

Northern Mule Spun Carded Yarn on Cones.

10s	22 @22½	12s	22½ @23
14s	23 @23½	16s	23½ @24
18s	24 @24½	20s	24½ @25
22s	25 @25½	24s	25½ @26
26s	26 @26½	30s	27½ @28
40s	31 @32		

Northern Mule Spun Combed Peeler Yarn on Cones.

10s	27 @27½	12s	27½ @28
14s	28 @28½	16s	28½ @29
18s	29 @29½	20s	29½ @30
22s	30 @30½	24s	30½ @31
26s	31 @31½	30s	33 @35
36s	38 @39	40s	41 @43

The Knit Goods Market.

A considerable number of knit goods manufacturers, on the eve of a banner winter for production and with orders piling up in mills already operating at capacity and behind with deliveries, are in a position about as uncomfortable as when they were between the alternative of shutting down or accumulating stock. In the last few weeks stacks of orders have come for immediate delivery, orders which, in many instances, mills were not prepared to fill. On top of these early fall orders comes more, and manufacturers should be reaping a harvest. Those who prepared for this boom, that pretty nearly everybody said must come, are doing so.

But, as in the jobbing trade, there were mill buyers who did not anticipate a rush, and, neglecting to cover their yarn requirements, are forced to pay the highest price of the year for yarns for immediate consumption. Fortunately for this class, whose views of the future seem to have been obscured, those who believed the floodtide would come are more than upholding prices. In cotton underwear two advances have been made, in some lines, and hosiery mills are marking prices up commeasurately with a prospective stiffer cotton market.

One mill is known to have contracted for 1,000,000 pounds of yarn at, or near, the year's lowest price level, and at the recession, following the first material advance, it took on 450,000 pounds more, these contracts carrying it into February next.

The buyer for a very large concern, operating a chain of important mills, thought he saw low priced cotton for months to come and accordingly contracted very conservatively. To-day he is buying yarn at the market for immediate consumption.

Although the situation for weeks past has favored buying, jobbers continued to ask for price concessions. The story is told, and vouched for by evidence that cannot be disputed, of a Chicago house which, upon receipt of 10 cases of knit goods in September, complained that the merchandise did not conform to samples, but suggested that if the mill were disposed to make a reasonable concession the house would accept the goods and dispose of them as seconds. "Return the goods at once," was the mill's reply.

"Oh, we don't want to cancel the order," pleaded the Chicago house.

"But the order is cancelled; return the goods," was the rejoinder of the mill.

The merchandise was shipped back to the consignor, and since then the jobbing house has reinstated its order, at an advanced price.

A mill which had been importuned for a lower price than a customer had been paying, notified the latter of an advance, and stated that it could shut down and sell its stock of cotton yarn at a handsome profit.

The trend among mills generally is toward a price level that will not only yield a profit on yarn purchased now, but afford a fair degree of protection against a still higher priced raw material.

The complaint is heard in the knitting trade that yarn prices already are on a basis of 14 cent cotton, but it is frequently admitted by some of the more optimistic manufacturers that the situation is heading toward 15-cent cotton. Knit goods manufacturers have had no such stimulus for several years as they are having forced upon them now in the phenomenal demand for merchandise. This is true particularly of underwear. From the Mohawk Valley in New York State come trustworthy reports of mills, which in June were on half time, operating now 23 hours in every 24.

A leading jobber's explanation of the conditions is that merchandise which should have been on the retailer' shelves in September is being called for now. Retailers and jobbers, as well as some mills, were simply caught short. They deferred buying believing that, as a year ago, there would be hosiery and underwear aplenty when it was wanted.

While the spurt in knitted goods applies more specifically to merchandise for spot deliveries, it is having a wholesome effect in promoting buying for next spring's delivery. Once the buyer becomes more thoroughly convinced of the stability of the cotton market, it is believed the big houses will be in the market anticipating next year's wants. This view, and the disclosures of empty shelves the country over, is taken as pointing to a bumper winter in knit goods manufacture.

Perhaps the most encouraging phase of the situation is the steady demand at advancing prices. Up to June, it is estimated by statisticians in the hosiery trade, not over 40 per cent of the normal production had been sold. There is no inactive stock now, except in lines that are not popular.

There were some heavy accumulations; one up-state manufacturer who is notoriously long on faith, kept his mill running at capacity throughout the summer, piling up stock. He has sold every case at a substantial profit, and recently contracted for deliveries in Norway and Sweden.

The Manufacturers Supplies Company, distributors in the South and local territory for a well known needle company of New England, reports mills buying needles more freely than for many months, and it not infrequently is necessary to reject orders. The demand for needles is far ahead of the supply, it is stated by this company. The improvement in the knitting trade is more radical in the South than in the North. A representative of this company said needle prices have been twice advanced this year.

While there is no material improvement in the dye situation, it is apparent that the entering wedge for affording relief has been driven. Sulphur black is being turned out in small, but commercial quantity by a concern in Reading, Pa., and another company in the same city gives assurance that shortly it will be able to deliver oxidized black.

According to a representative of the General Chemical Company, that concern is filling all of its contracts for delivery of aniline oil, at a maximum of 25 cents a pound and a minimum of 10.93 cents. But for the shortage of other dyestuffs, it is believed the General Chemical Company could now meet 75 per cent of the normal demand for aniline oil.

COTTON MANUFACTURING.

Keeping Yarn Numbers Even.

BY J. T. KERSEY.

Even numbers can only be kept correctly by starting the cotton right at the opening room and putting it through each process as it should be. If we expect the numbers to have a close average we must not use damp cotton today and dry cotton tomorrow, but we should have two opening rooms and keep at least one day's run ahead all the time, i. e., open the cotton today that is to be used tomorrow. This will give the cotton a chance to reach the normal condition, in case it is too damp when it is first opened. Owing to the fact that nearly every bale of cotton differs slightly it should be blended thoroughly by mixing several bales at one time, and the more the better. No matter whether the cotton is opened by hand or machinery, it is best to mix several bales at one time. In large mills, and a good many of the small ones, the cotton is usually opened in the cotton house, and conveyed to the automatic feeder by means of a fan through a flue and cleaning trunk. However, it is just as important to get a thorough mixing this way as it is the old way, and the bagging and ties should be removed from at least ten bales if not more, a layer taken from each bale, in rotation and mixed thoroughly and evenly with the waste that has to be reworked. All the waste that is made each day should be used in the next day's mixing, and never allowed to accumulate so as to make it necessary to use more than the normal amount of waste in each mixing. Too much reworked waste will affect the numbers, cause the laps to split, and also make the work run bad, throughout the entire mill. It should also be noted that the waste should be mixed through the whole lot of cotton and not dumped in all at once. Presuming that we have done our mixing properly we must improve it and not just get it through the pickers in a poor way.

The only way to keep the breaker laps even in weight per yard is to keep the automatic feeder as near the same fullness as possible, preferably three-fourths full, and keep the air passage or fan drafts regulated properly. Unless we feed the breaker systematically, and also make our fans distribute the cotton evenly on all parts of the revolving screens, we will have thin places all through our laps, with different weights per yard, which will make variable card sliver, and variation in numbers throughout the mill. This can be remedied to a certain extent on the intermediates and finishers, providing the eveners are working right which is seldom the case, as very few of them are kept in first-class working condition, as they are allowed to get clogged up with dirt and lumps of cotton, and the result is that they can't respond to a delicate change in the weight of the in-coming feed. Sometimes the different parts of the mechanism of the evener bind or rub against each other, or works hard, and when this is the case, especially on the finisher, we get a very uneven lap with light sections, which makes uneven card sliver.

No matter what weight per yard the laps are required to be, the evener belt should be made to run as near the center

of the cones as it is possible to get it, and it will do so providing the right draft gear is on the machines. There are two reasons why the belt should run in the center of the cones: one is that it has an equal adjustment for either light or heavy feed; and the other is it keeps down variation from slippage, as invariably it will slip on the small end especially if the cones are oily or tight in the bearings, and every time it slips it will cause light sections in the laps, which will make light sections in the card sliver.

If we get good even laps from our pickers, and fail to handle them properly at the cards, we will still have too much variation in the card sliver. All practical carders know that it is very hard to get several cards set up so that they will produce sliver all the same weight per yard. For instance we may have the same draft gear on all the cards, yet some of them will be taking out more strips, or letting more lint fall under the licker-in than the others, which will make a difference in the weight of the sliver. So it is very important to see that each card is making sliver as near like all the others of the same style as possible, as it requires perfect card sliver to have perfect numbers in the yarns.

Sometimes the laps split and run into the cards double, and sometimes as much as three layers go in, which makes the sliver very much too heavy, and when this is the case, the card tender should be required to fix the lap, and then doff the can with the heavy sliver, and remove the doublings or it will get in the drawing, and cause several yards of sliver and a good many bobbins of thread to be too heavy.

A careless card tender can also damage the sliver by letting heavy and light work get past him. This usually happens during the time the cards are being started up after each stripping, as he puts up the ends before the card has time to fill up, and the result is that a large portion of the sliver is too light.

Heavy and light work at the drawing frames is caused mostly by the operative lapping his piecings too long and also running his frame with one or more ends down at the back. This should not be allowed, as a drawing tender knows when he wakes bad work, and if he is trained properly and watched constantly he will soon get his piecings very nearly perfect. The stop motions will cause bad numbers, also, by letting singlings through the rolls and into the cans if they are slow to respond to an end breaking or running out at the back. I make it a rule to look over my stop motions two or three times each day to see that they work freely and as a safeguard I instruct the operatives to stop the machine in case anything gets the matter, as one can of bad drawing will make a good many bobbins of bad yarn.

In my opinion we get the most of our variation at the trumpets and between the front and calender roll. The trumpets must have the proper bore for a given weight of sliver, and the draft between the front roll and the front calender roll must be right, or the sliver will be irregular in size and weight per yard. The trumpet bore should be small enough to condense the sliver and make it firm and strong enough to pull its weight, and the draft between the front roll and the calender roll should be just enough to keep it from dragging, but the end should bag slightly. If the bore in the trumpet is too large, or the draft too great at the calender, the result is sure to be stretched or uneven sliver.

Dry rolls clogged with cotton, or badly worn rolls are detrimental to even numbers, also rolls that are not weighted properly, especially metallic rolls, will make sliver of variable weight. Too much weight on one end of the roll and not enough on the other end, is one method of not weighting properly.

Good rolls in front, middle, and back are absolutely necessary on the roving frames if we expect even roving, and the roving guides should traverse as near the full length of the roll as possible and not fall over the ends. The rolls should be kept clean and lubricated properly or they will run sluggish and this is true especially on the middle line.

The tension is another place where we get lots of bad work that causes considerable variation in the roving and yarn. Where a speeder tender has to let off and take up on his cone belt, conditions are certainly bad, and invariably the numbers at the spinning are the same way. The ends on the roving frames must not run tight as this stretches the roving irregular, and it can never be made right at the spinning frames, and will be sure to make uneven numbers.

There are several things to cause this. Bobbins that are not uniform in size will cause uneven tension, also to run the traverse too fast will stretch it. The wrong number of teeth in the bobbin cone gear will start the bobbin speed wrong on a new doff which will stay wrong all the time and cause the ends to run tight unless the tension gear is too large, and if this is the case the ends will finally run to slack which will necessitate taking up on them. This will result in getting them too tight more often than otherwise.

The proper way to get the tension right is to be sure that all the bobbins are the same size, start the cone belt at the end of the cones on a new doff, and if the proper cone gear, or to make it plain, if the bottom cone has the right speed, the ends will show a tendency to bag slightly which will be proof that the ends are not too tight, and if you have the right tension gear, the machine will run the whole doff without having to change the position of the cone belt, unless affected by other conditions, such as a change in the weather. It is better to run the ends with the least bit of bag, than to run the risk of having the roving stretched, and if a good supply of different size tension gears are kept on hand this can be done very easily.

There is very little that can be done at the spinning that will improve bad roving, so far as even numbers are concerned, but when the roving is doubled it will help matters some, but not very much. However, good roving can be damaged at the spinning causing variations and unevenness if the rolls are bad or if too much draft exists. I recommend not going over 7½ on single roving and 10 on double roving with the draft.

There will scarcely be a time when any of the gears will have to be changed on account of heavy or light work if my instructions are carried out, as I have run a whole year and never had to change anything unless it was the crown gear on the front drawings in very damp weather, and I unhesitatingly recommend keeping the numbers at the drawings. If the drawing sliver is weighed four times each day, heavy or light work can be caught and got right before it gets mixed all through the roving and spinning machinery where no gear will get it right, as if heavy work gets mixed with light work in the frames, to make any change that will affect the heavy work will make the light work too light, and while we may get our average number right we will have very great variations.

Designs for Fancy Cotton Fabrics.

BY THOMAS WOODHOUSE AND JAMES IRELAND.

PART TWENTY-FOUR.

The fabric illustrated at Fig. 107 is a splendid example of an ogee pattern made from simple weaves. Both warp and filling are of a pea-green color, and there are 92 threads per inch and 52 picks per inch. The design J, Fig. 108,

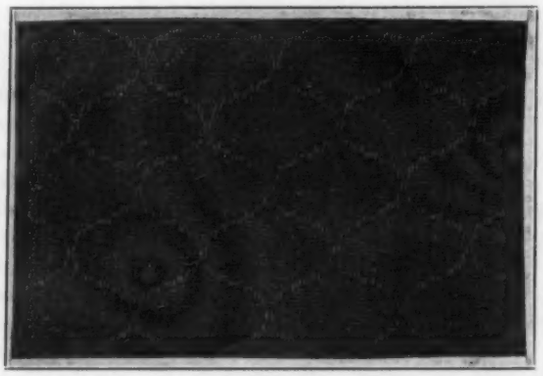


FIG. 107.

shows that it is nearly all plain, but the difference in the number of threads and picks again results in this section having the appearance of a repp weave. The ogee ornament on one surface of the cloth is made by the floats of five, i. e., the five successive solid marks, whereas the five successive blanks which adjoin the solid floats perform the same function on the other side of the cloth. This arrangement, coupled with the large number of threads per inch, makes the fabric reversible—the ogee pattern being thus developed on both sides by long floats of warp, while the repp on both sides is due also to the warp threads interweaving with the weft in plain order. The complete design is on 72 threads and 40 picks, but the draft and weaving plan at K and L respectively show that 18 harnesses only are required.

Another very pretty cloth of very similar structure to the last is illustrated in Fig. 109. The design, draft, and weaving plan for this cloth are shown respectively at M, N

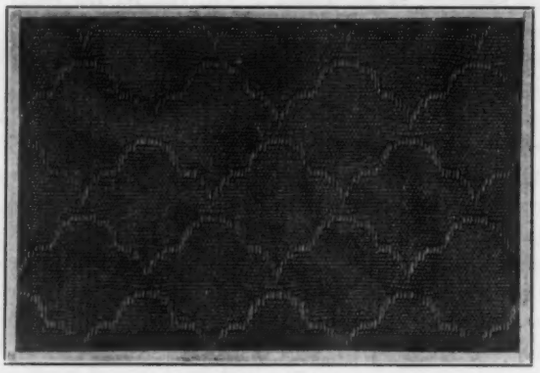


FIG. 109.

and O, Fig. 110. There are 92 threads and 52 picks per inch as in the last example, but the yarns are of a pale green color. It will be seen that the two cloths differ in the outline of the simple ornament, in the number of picks per repeat, and in the number of harnesses required for their production. The number of threads per repeat is the same in both patterns. These facts, coupled with that of different colors, appear to indicate that several designs have been made from the same kind of warp—probably in natural color—and then the pieces have been dyed to various beautiful shades. It is also quite probable that the fabrics have been woven in a jacquard, although the two illustrated could be woven in dobby looms. The cloths are admirably suited for curtains or for upholstery work of a light nature.

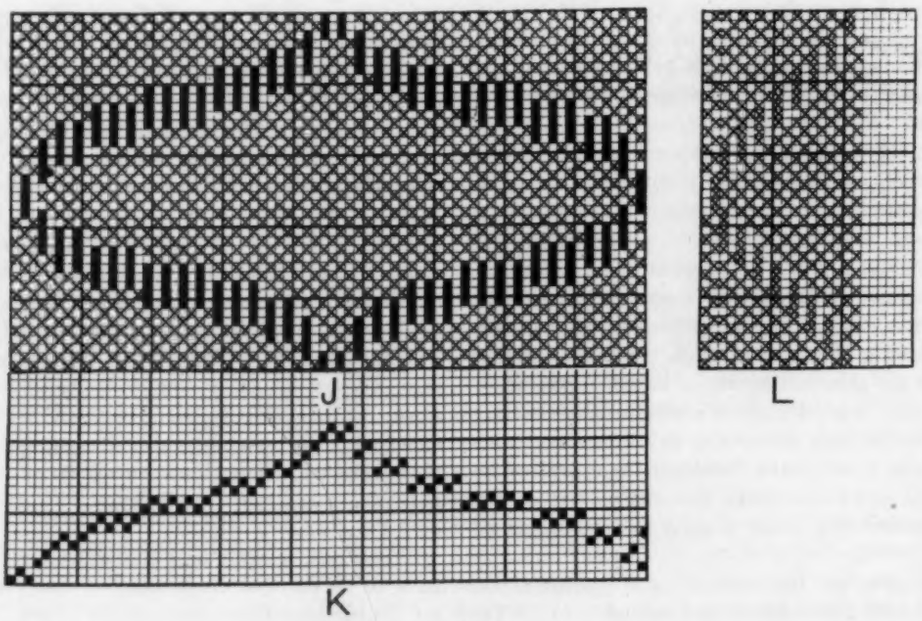


FIG. 108.

(To be continued.)

Don't be afraid of imitators. Originality always bears a trademark.

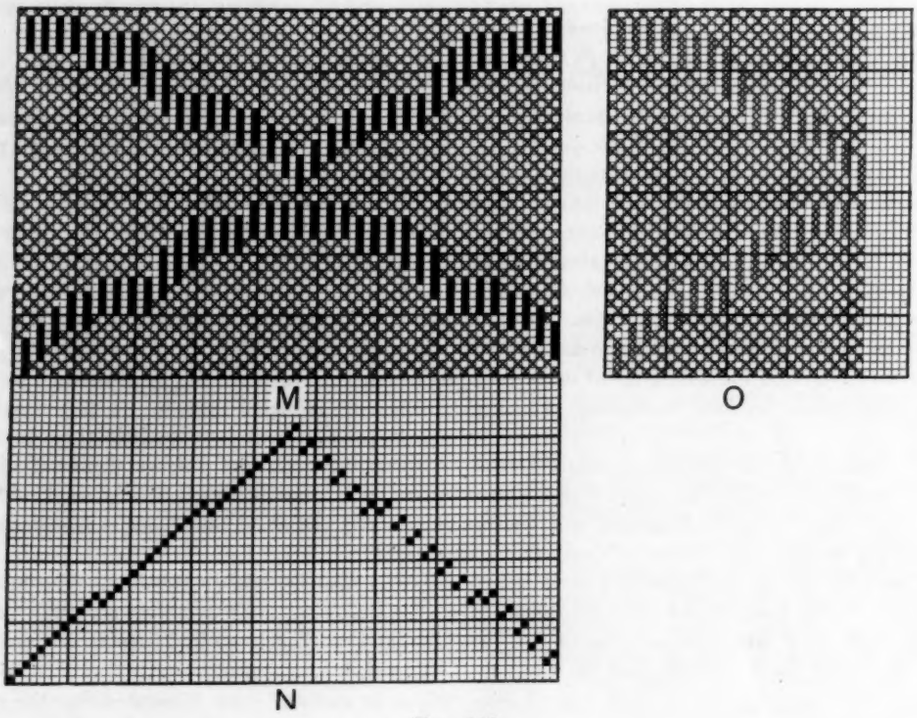


FIG. 110.

CARING FOR MACHINERY.

BY WILLIAM SHAW.

The proper care of machinery is an important consideration in every department of a cotton mill. Every overseer should train himself to look upon the machinery, representing thousands of dollars, with a feeling of responsibility. He should make sure that the machinery intrusted to him is well cared for and handled carefully, for he should realize that the life of the machinery is the life of the plant.

One can find beaters in the picker room in some of our mills revolving 1600 R. P. M., and should one ask the overseer in charge why the speed is so high, he is unable to give a good reason. He blames it on his predecessor, or the superintendent. High speeded beaters destroy the air-currents of the fan to a certain extent, which causes lap splitting.

I have seen fans revolving 1400 R. P. M. when in no case they should run over 1000 R. P. M. Why this high speed? At this very writing there are mills where the beater and fan speeds are so high, that the journals have to be rebabbited every little while.

Every machine in the mill should receive its share of care and attention, but the card is the most important.

Not long ago, a friend of mine, a carder, was ordered by the superintendent to increase the production on every card 200 pounds a week. The superintendent was formerly clerk in the mill office and had little or no experience about cotton manufacturing. My friend, instead of pointing out the result of the change, carried out the orders to the letter. Now he is looking for a job. The new carder had more backbone and insisted that six new cards had to be installed, and they were installed.

Why did we get stronger yarn from the old stationary top cards? It was not because the old stationary flat card was a better card, we know differently, it was the difference in speed.

Nine times out of ten, the difference between the well-managed mill and the ill-managed mill is the speed of the different machines. Let us go back to the picker room. Can a single man deny that a high speeded beater will injure the staple and that it destroys the air-currents created by the fan? Can it be denied that it makes the staple fluffy? Can it be denied that a high speeded fan will not attract the same proportion of stock on both cages? Can it be denied that a high speeded card will not turn off the same quality as that of the card having the proper speed? Can it be denied that the drawing will attenuate the sliver best when running at the proper speed?

Again, why does the outline of the American cones differ from the English cones? There is only one answer, we drive our fly frames faster on this side of the water. Cones may be figured out before the additional factors of slippage, or difference in tension between the empty and full bobbin due to the slight variation in the pressure of the paddle and the difference in diameter as the bobbin builds up, but the chief factors, are both the speed and the pressure of the paddle which regulates the diameter of the bobbin. Therefore, in order to modify cones to get a uniform tension from empty to full bobbin, a certain speed must be adopted, and this is inserted in the builders catalog. How many men in charge of a mill or department consult the builders catalog before increasing or reducing the speed of fly frames? How many know the effects of a change in speed on the diameter of the bobbin or on the outline of the cones?

Any person who understands the theory of the flyer knows that a decrease in speed will decrease the pressure at the termination of the presser, which means that the diameter of the bobbins will increase to a larger proportion to suit the speeds governed by the lateral movement of the cone belt, or in other words, a change in speed destroys the

relationship of the surface speed of the bobbin and front roll.

If the speed is increased, the amount of pressure is increased and the diameter of the bobbin is not allowed to increase to suit the intermediate speeds of the cones. In the first case we have stretched roving, and in the second case the rack must be changed every little while, for it is impossible to put on the proper rack when not running the proper speed. The reason for the latter statement is that the diameter of a fly frame bobbin is only equal in addition, and very unequal in proportion. You can put on a rack gear to take care of the proportion in most cases, but no rack gear ever remedied the wrong speed on any fly frame. This is responsible for bad conditions in many cotton mills.

This is what I term caring for machinery. Any person can oil and clean machinery, which of course comes under the same head, but it requires skill, judgment and knowledge to know if such machinery is properly speeded.

Here is another point of view. There is a certain mill where the work runs badly year in and year out, while in another mill the work runs well most of the time. The help soon learn the better place to work, and the bad running mill is always short of help. Even when help is plentiful, it must have the poorest help which adds to the already bad condition.

To know how to operate and care for the machinery is one of the most potent factors in cotton mill management, and the chief reason why some mills run better than others.

I have just visited a mill that was recently supervised by efficiency engineers, and I found the speeds in the card and spinning rooms far in excess of what they should be. The intermediate frames were designed to run at a speed of 940 R. P. M.; these frames are now running 1080 R. P. M. It is useless to say that this excessive speed is not responsible for some of the bad running work found in this mill.

When drawing frames are highly speeded, it only takes a fraction of a minute from the time a trumpet chokes, and the frame fails to stop, for the cotton to become lapped around the steel rolls. In most cases, roller laps are hard to remove, and often knives and screwdrivers, etc., are used to remove the laps. I am willing to admit that few carders allow this practice, but when it is practiced, the carder himself is to blame for having such a high speed. It is a shame that we can enter cotton mills which have been in operation but a few years and find the machinery showing marks of unnatural wear due to lax methods for which the overseer is to blame.

Go to your carder and ask him how long since the spindles of a certain fly frame were oiled, and in nine times out of ten, he is unable to say. Ask him how long since all the slow motions were oiled and it is safe to say he is unable to fix the right time. He may say every month, but what proof has he that they are oiled at that time.

Is it not common to find the slide pulleys stopped on fly frames?

Stand at the end of any fly frame that has been in operation a few years, and you can see low spindles here and there caused by a dry step. It does not require any skill to oil and clean machinery, but it does require system, and few practical systems can be found in existence in most mills.

Space does not permit an outline of the whole system as used in one mill in this article, but following is a brief description which can be put into practice by the reader if he cares to do so.

In the card room they have a book which is known as book No. 1. There is a page for the oiling of the spindles, scouring, grinding cards, oiling slow motions, etc. Some of the pages are ruled daily while others are ruled and dated monthly as the case requires. For instance, if the oiler oils the spindles on frames No. 23 and 24, all the oiler does is to make an X opposite the numbers of the frames in the dated column. It only requires a second to do this, and it takes very little time for the overseer to inspect the book and inspect the work also. I need not point out here that any person can judge within a few hours after oiling spindle bottoms whether or not they were oiled.

The same with card grinding. The minute the grinder inserts a cross after grinding a certain card the overseer should immediately go and inspect the web from this card. With such a system no one can fool you, for no hand would dare to make a cross without doing the work when they know the overseer will immediately inspect the work. It makes it easier for the overseer, because all that is necessary for him to do is to inspect the book and work daily.

On the other hand, those in charge of the machinery cannot shirk the work that the book calls for daily.

Very few mill men consider the effect dry slides and pulleys will cause on the running of the work. On all fly frames built in America the cone belt drives the bobbins. Some builders claim otherwise, but the fact is there. Now, if the slides or pulleys become dry or clogged with dirt, a certain amount of resistance is offered to the cone belt, which causes a certain amount of slackness. This slackness is generally remedied by changing the rack gear, and when these parts are cleaned and oiled, then the rack gear must be changed back. In most cases this is not done before a large amount of stretch takes place.

The chief reason why machinery is neglected in mills is due to the fact of those in charge of the machinery not understanding the theory of the machinery entrusted in their care. If possible, every person in charge of machinery should attend a textile school, and if this is not possible, take a course in a correspondence school or study a good textile journal like COTTON. When the working principle of a machine is understood, then one knows what neglect will cause.

Tasmania is dependent upon foreign countries for a large proportion of its hosiery. Appreciable quantities of all kinds of hosiery, usually manufactured in the United States are imported, but in the past American exporters have taken little interest in this trade—as is evident from the fact that out of a total importation into all Australia in 1913 of cotton hosiery of the value of $1,150,000 the United States supplied only $4,500 worth. Tasmania imported $16,000 worth (from all countries) direct, while it is estimated that the jobbers of Melbourne and Sydney sold an additional $35,000 worth to local hosiery dealers. Germany supplied over 80 per cent of the cotton hosiery imported into all Australia.

KNITTING DEPARTMENT.

THE MANUFACTURE OF FASHIONED KNIT GOODS.

BY WILLIAM DAVIS, M. A.

PART SIX.

Probably the easiest garment of production in this branch is the man's shirt. For the normal article no fashioning is required for the body, the sleeve being the only part requiring attention. The central portion is made in one piece twice the length of the body and the full width, the one half of the fabric serving for the front and the other half for the back of the garment. The material as made on the machine is sketched at Fig. 1. the rib tops or bottoms being previously prepared on the rib machine, the 1 and 1 rib forming the most usual type employed. On the machine the rib is worked about 4 inches to lie 3 inches in length when finished, and it is sought to have in the rib top the exact number of stitches required for the width of

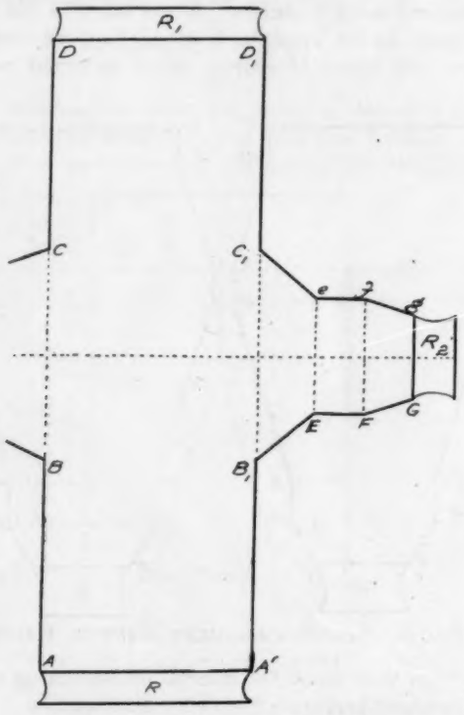


FIG. 1. DIAGRAM OF A MAN'S SHIRT.

the garment. The width is chosen so that the garment will finish 19 inches wide for an ordinary man's size. The rib top having been transferred to the needles of the frame section to the width A A_1, the fabric is knitted at uniform width along the lines B B_1, C C_1, DD_1, when the latter point is reached the fabric is pressed off the needles.

The next process is to add the sleeve, which is done in the same manner as described for the ladies' vest, that is the fabric already worked is turned through a right angle, and the length divided into three equal parts, the middle third B_1 C_1, being run on to the transferring bar by the assistant, one article above the other on the bar according to the number of divisions in the machine. If the sleeve is required short, then it is attached in the manner described for the ladies vest, but in Fig. 1, the long sleeve is on this occasion presented. Probably the short sleeve is the more generally used, but the long sleeve is also much demanded as it covers the entire arm and affords the maximum of warmth. On the other hand the short sleeve is preferred by many, because it gives greater freedom to the movements of the arms. Working the sleeve at the width B_1 C_1 for a start, it is at once narrowed into almost half the width at Ee, and at this width is continued to F_f, from which width it is again slightly narrowed to Gg. When this is finished, the left side of the fabric is next run on to the needles at BC exactly the same width as before and narrowed exactly as for the sleeve on the right hand side.

When this is completed, the missing rib tops are added, namely R_1 attached to DD_1, the rib top R_2 to the end of the sleeve on the right and a similar one to the sleeve on the left. By the way in which the sleeve is attached it will be seen that the stitches occur in a direction at right angles to the stitches in the body of the article, but they are in the direction of the length of the arm. The measurements for an average man's size would be about 19 inches wide, and the length of the shirt would be about 30 inches, or 60 inches of fabric counting the face and the back, the entire length of the sleeve to the end of the rib top would be about 20 inches, or slightly more than the length of the body, of this length the rib top would account for about 5 inches, and the three divisions indicated about 5 inches each. These dimensions refer to the sizes finished and for the working lengths and widths, a certain percentage would require to be added to allow for shrinkage on the frame and in the milling machine.

The only point where fashioning is needed in this garment is at the sleeve and it will be instructive to give the particulars for fashioning the two parts from B_1 C_1 to E. and from Ff to Gg. As these are performed as narrowings, it is usual to make them a lead or two stitches at once. Let the article be made as before on a 20 gage frame and let the material be a woolen thread which requires an addition of 20 per cent to the warehouse dimensions quoted, to arrive at the widths to be worked in the frame. At the commencement of the sleeve, a width of 24 inches has to be reduced to about 14 inches over a length of 7 inches of cloth, the fabric being worked as before to the gage, with 20 courses inserted per inch on the frame. The narrowings in this example are to be formed along each side so that a total reduction of 10 inches means, a reduction of 5 inches on each side. The gage is 20, which means 20 times 2 = 40 needles on 30, or 13⅓ needles per inch, for 5 inches this would give 5 times 13⅓ = 66⅔ needles to narrow. As they are to be narrowed 2 at a time this gives 33⅓ narrowings. The length is 7 inches with 20 courses per inch so that the total courses is given by 7 times 20 = 140 courses, dividing this number by 33⅓ will give approximately 4 as the interval of narrowing. After every four courses the frame will narrow 2 needles at once over a distance of 7 inches of fabric. For the second narrowing FG, the length is 6 inches, and the width has to be reduced from 13 to 10 inches, which gives a reduction at each side of 1½ inches. This gives approximately 22 needles or 11

narrowings distributed over a length of 6 inches = 6 times 20 = 120; this divided by 11 gives the interval as approximately 11 courses, which in practice would be made either 10 or 12.

When the different portions have been made and the rib tops attached, then the article required to be seamed for which purpose it is folded along the dotted line shown in the center of Fig. 1, and the parts seamed together as illustrated in the sketch of the complete garment Fig. 2. The sides of the shirt are seamed at A_1 B_1 along D_1 C_1, for the sleeve, edge E F G is joined to edge e f g, and similarly for the left side and the left sleeve. The trimming is performed in much the same manner as the vest; the fabric

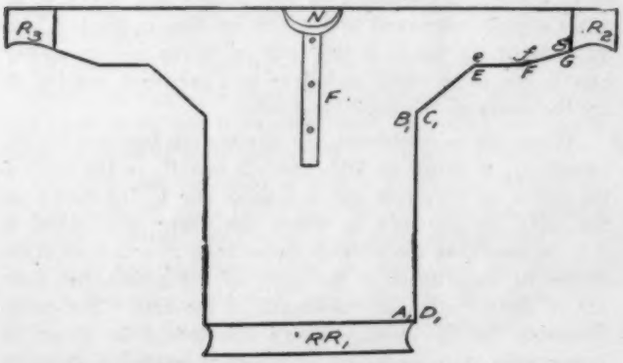


FIG. 2. DIAGRAM OF THE COMPLETED GARMENT.

is cut as shown at N for the neck and the front with buttons attached as at F. For the front an extra piece of fabric may be inserted both above and below, but it is customary to use the fabric itself for the upper part of the front and for the lower part to insert a piece of cotton or cotton and wool cloth. At the neck N there is considerably more than the average of wear and tear and at the two corners small pieces of strong silk are inserted to give greater strength, also at the edges of the front are inserted several rows of cotton stitching so as to give the fabric greater solidity and increase its period of wear. It may be taken as a general axiom in connection with the trimming of knitted garments that all edges and corners where extra strain is imposed should be reinforced, otherwise the cloth yields and curls and soon becomes unsightly and ragged.

The second article of necessity for men's wear is the pants and these have to be made in two or four portions. If they are worked in two sections, then there is a seam along the inside of the legs, if they are worked in four portions, a seam is formed on either side of each leg; of the two methods the former is the most favored and generally adopted for the bulk of articles. It sometimes occurs, however, that the garments are required of such a width at the seat that they cannot be worked on the normal frame division, and to overcome this difficulty they are worked in four portions, two for each leg. In Fig. 3 are given illustrations of the two portions worked when the pants are made in halves, the part on the left being the section composing the right leg, and that on the right for the left leg. It will be sufficient to consider the portion M and trace how it is produced and fashioned on the frame, for the part N is but a duplicate with the seat portion reversed. In sketch M the width at the top indicated by A A_1 is first placed on the needles, and the length worked to B B_1. At this point have to be brought in the widenings necessary for the seat on one side only, the part given by BC, this being for the extra room required at the hips, no change in the contour being made on the left hand side. A short piece of cloth is then worked at the new width from C to D, when the leg proper is begun. This is performed by narrowing along the lines D E and D_1 E_1, the narrowings being identical on either side and taking the cloth just under the knee of the garment. From E to F the fabric is worked plain, and from F to G a further narrowing takes place to the anble.

To draw out the fashioning scheme, we have three places to consider, namely the widenings on one side only for the seat, the narrowings on both sides for the knee and then the ankle. As an example for the normal man's size let the width of the work on the needles at B be taken as 23 inches, then for the seat we should require an increase of about 3 inches extending over a length of say 9 inches. On the 20 gage frame, there are 20 times 2 = 40 needles on 3 inches, so that three inches of widenings represent exactly 40 needles or 40 widenings, 1 needle at once. The length over which these extend is 9 inches with say 20 courses per inch = 180 courses, which divided by 40 gives an interval of 4½ courses, and the machine would be set to widen, say every 4 courses. If the fabric is not worked to the gage, as for example, it oftens happens that for a 20 gage, only about 16 courses would be found per inch,

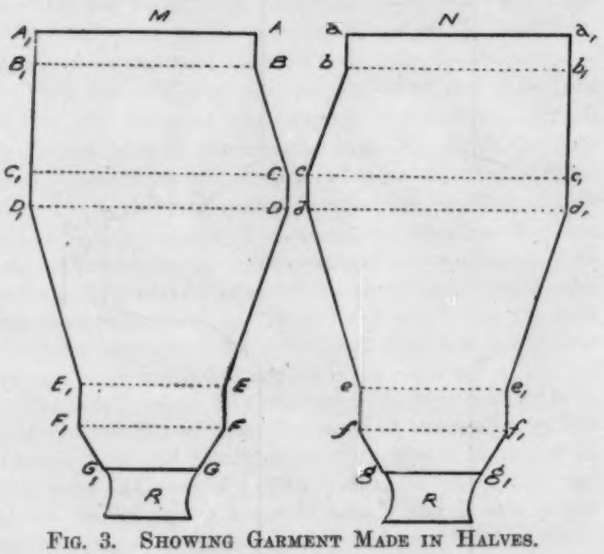


FIG. 3. SHOWING GARMENT MADE IN HALVES.

if the yarn were stout, the interval of fashioning would be more frequent perhaps after every third course.

When fashioning in to the knee from D to E, the width is reduced by narrowing by 2 needles equally on either side, and at the beginning of the leg the width would be as mentioned, 26 inches on the needles, and it would be necessary to calculate the narrowings to reduce the width from 26 to 16 inches, which, distributed equally on either side, would give a total reduction of 10 inches, or 5 inches on either side. The 20 gage has 20 times 2 = 40 needles on 3 inches = 13⅓ needles per inch. For 5 inches the needles are

$$\frac{40}{3} \times 5 = \frac{200}{3}$$

but as these are narrowings, they would take place 2 needles

at once, which makes the number 100/3, or 33⅓. These have to be introduced over a length of about 18 inches of fabric, giving 18 times 20 = 360 courses. The interval is given by dividing this by 100/3.

$$360 \div \frac{100}{3} = \frac{360 \times 3}{100} = 10\,4/5$$

as the interval. That is the frame would be set to narrow 2 needles on either side, after every 11 courses had been worked.

The other fashioning is also a narrowing and takes place when reducing the width from the leg in to the ankle, the width to start with being 16 inches as stated, which it is required to diminish to a width of about 11 inches at the ankle, narrowings taking place 2 needles at once on both sides. 16 minus 11 gives a total reduction of 5 inches, or 2½ on each side equals

$$2\frac{1}{2} \times \frac{40}{3} = \frac{5}{2} \times \frac{40}{3} = \frac{100}{3}$$

needles. As they have to narrow 2 at once this gives 50/3 or 16⅔ as the number of narrowings. The length over which these are distributed would be about 4½ inches and with 20 courses per inch, this would would give 4½ × 20 = 90 courses, dividing this by 50/3 equals

$$90 \times \frac{3}{50} = 5.4$$

as the interval. The frame will be set to narrow 2 needles on each side after every 6 courses have been worked.

The given particulars of fashioning for this garment

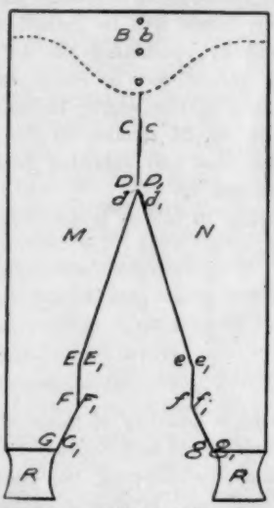


FIG. 4. THE PARTS OF FIG. 3 SEAMED TOGETHER.

will be found to correspond with the methods adopted in practice with firms whose staple trade is of this class of goods.

As already mentioned, the second portion N is made exactly as the first portion M, except that the seat is placed on the opposite side, otherwise the fashionings have to be carried out in precisely the same scale as for the part just described, in fact it is a matter of the utmost importance that there should be no alteration in the adjustment of the frame in the interval of working the first and second portions, or the resulting garment will present the interesting spectacle of having a "long leg and a longer one." The method of joining will be understood by consulting Fig. 4, which is a front view of the two portions joined into the complete garment. The part M is shown on the left and the part N on the right of the figure and by tracing the position of the lettering, the mode of seaming may be learned. The back join is not visible in the drawing, but the parts ABCD of M are joined to the parts abcd of N, at which point there is a divergence and each leg is seamed upon itself, for the left DEFG is seamed to $D_1E_1F_1G_1$, for the right the side "defg" is seamed "$d_1e_1f_1g_1$," and the rib bottoms R are seamed as before. A considerable advantage will be noted from this means of manufacture and that is, the seamed portions are all concealed to a large extent in the inside of the garment and the outer portions of the legs are perfectly plain around. In finishing, a large gusset has to be inserted at the fork D_4 to give more comfort and also in the center of the back at the top B_5, it is usual to insert a gusset or V portion which can be drawn together or let out according to the variation in diameter of the wearer as it may be effected from time to time, before or after meals, etc.!

The whole upper part of the garment is covered with strong cotton or cotton and wool cloth, with the edges firmly sewn with two or more rows of stitching to give increased strength. In many cases an extra height of about three inches of fabric is placed at the back of the trouser, so as bring it further up the back and afford increased protection to the spine. In some cases the bands of woven cloth are simply attached to the top of the knitted portion, but the more general way is to make the knitted fabric so as to reach well up the back and introduce the bands as extra fabric over and above the ground so that under the bands there is a layer of continuous knitted fabric.

FASHIONING ON DIFFERENT GAGES.

From an examination of the calculations involved in fashioning these goods, it must not be assumed that it is necessary to make such calculations for every variety of garment made. The manufacturer has usually his stock of standard sizes and qualities and once the narrowings and widenings are arrived at, they apply to all garments made of the same class, with modifications according as the article is worked tight or slack in gage. If however calculations for the same degree of fashioning be made in a range of gages and compared, it will reveal the interesting fact that the interval calculated is the same for all gage numbers.

This is a large statement to make and one which, if proved, will result in much greater confidence in the use of the rule of fashioning, that an interval calculated for one gage will apply to all other gages, working normal fabrics. To bring forward proof of this let us take the example of the last fashioning given in connection with the pant, namely to narrow 2½ inches on a 20 gage frame over a distance of 4½ inches. The interval calculated was found to be 5.4; now let us calculate another series in 10, 30 and 40 gage frames, all worked with their corresponding gage number as courses per inch.

Ten gage = 10 times 2 = 20 needles on 3 inches = 20/3, needles per inch. 2½ inches of needles equal

$$2\frac{1}{2} \times \frac{20}{3} = \frac{5}{2} \times \frac{20}{3} = \frac{50}{3}$$

but narrowing 2 needles at once gives half this number, namely 2 5/3. The distance is 4½ inches and the courses per inch are 10, so that the total courses are given by 4½ × 10 = 45; the interval is obtained by dividing this by 25/3 which equals

$$45 \times \frac{3}{25} = \frac{27}{5} = 5.4$$

interval.

A similar calculation for the 30 gage will give 30 times 2 = 60 needles on 3 inches = 20 needles per inch. 2½ times 20 = 50 needles = 25 narrowings. 30 courses per inch over 4½ inches gives 4½ times 30 = 135 courses.

135 divided by 25 = 5.4 as in the other cases.

Finally for the 40 gage the needles per inch are 40 times 2 = 80/3, therefore 2½ inches of needles equals

$$\frac{80}{3} \times \frac{5}{2} = \frac{200}{3} = \frac{100}{3}$$

narrowings.

4½ inches with 40 courses per inch gives a total of 4½ times 40 = 180.

$$180 \div \frac{100}{3} = 180 \times \frac{3}{100} = \frac{27}{5} = 5.4$$

interval.

From the way in which these examples come out, it will be seen that we can claim this as a rule, that if a scheme of fashioning has been adopted for any particular of given size and shape in one gage, the scheme can also be used in making any other gage, as long as the same texture is maintained.

ANGLE OF FASHIONING.

Illustration Fig. 5 has been drawn out to demonstrate how the angle of working is effected by the interval of

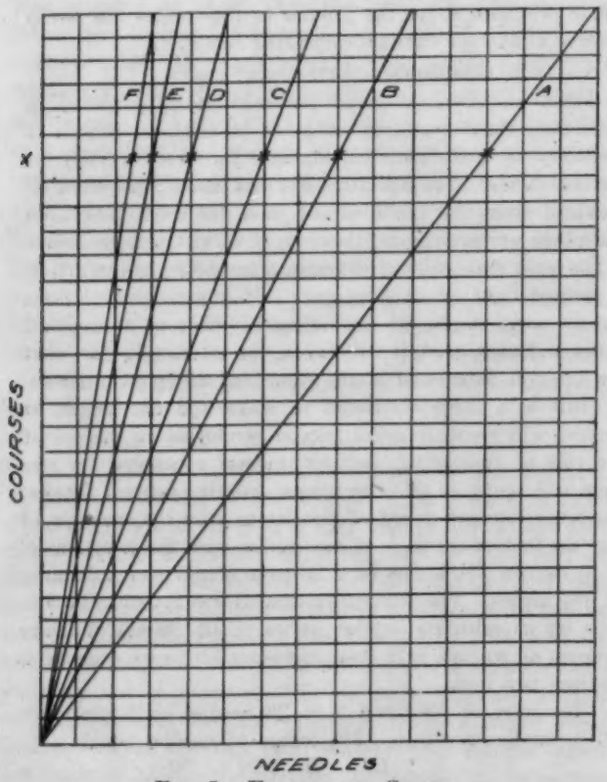


FIG. 5. FASHIONING CHART.

fashioning. The chart is drawn out to represent the normal fabric, the lines in the horizontal direction representing the needle spaces, and those in the vertical direction the spacing of the courses, there being 8 divisions in the horizontal to the same space as 12 divisions in the vertical, which represents the hosiery fabric worked to the gage with half as many more courses as needles per inch. Through those divisions a number of lines have been drawn to represent a series of fashioning intervals, namely 2-3-4-6-8 and 10. The line A shows the angle formed when the fashioning proceeds after every second course and the points will be seen to step up 2 divisions. Line B is shown at a steeper angle stepping up 3 at each course and similarly for the other lines until line F, which is the steepest because there the interval is only 1 in every 10 courses. If these angles be measured it will be found that the table is approximately as follows:

Line A	=	angle	of	52 degrees.
B	=	"	"	64 "
C	=	"	"	70 "
D	=	"	"	75 "
E	=	"	"	79 "
F	=	"	"	82 "

This chart could be made use of in working out fashioned goods, if a sketch of the garment were first made accurately drawn to scale, according to the dimensions required to be worked in the frame. The lines in the drawing where a fashioning had to take place would run at an angle corresponding to the frequency of the interval and by superimposing the drawing of the garment on the chart, the interval of fashioning for any angle could be found to a small limit of error. The chart is drawn out on the principle of fashioning 1 needle at once, if there is to be narrowing 2 needles at once, then the interval given by the chart requires to be exactly halved.

Another useful function of the chart as an indicator is to show how much fabric will be gained by fashioning a given distance, and by examining the different lines, the amount of fabric gained can be easily compared. If in the chart the spaces in the length be made to represent inches, let us count up 24 squares to the line marked X. Reading along this line and counting each square as an inch, the fabric gained by

Fashioning	10	is	2½	inches.	Line F
"	8	"	3	"	" E
"	6	"	4	"	" D
"	4	"	6	"	" C
"	3	"	8	"	" B
"	2	"	12	"	" A

The export field is proving of considerable interest to many manufacturers North and South. Some have already secured orders and are shipping the goods, while others are looking for business. It should be remembered, however, that in preparing cotton goods for export one of the necessary things to make this business successful is the careful packing of the goods so that when they are received at the foreign port they are in equally as good condition as when they were shipped from the factory. One important feature to thus successfully ship goods is to suitably line all packing cases with a case lining of water-proof paper either of the cloth-lined or two-paper type. It is also frequently necessary to use water-proof wrapping paper in this connection. Many mills have been buying goods of this character in small quantities through jobbing houses and these will undoubtedly be glad to learn of the fact that the Safe-pack Paper Mills at Brockton, Mass., are putting out an entire line devoted to this particular class of work.

SILK HOSIERY TRADE OF SOUTH AFRICA.

Although the white population of South Africa numbers considerably higher than in most countries. There is a only about 1,300,000, the per capita purchasing power is limited, but growing, demand for silk hosiery at moderate prices.

The imports of silk hosiery (underwear) via the port of Cape Town, as shown by official returns, for 1912 were valued at $9,528; for 1913, at $16,166. Trade statistics do not indicate the countries of origin for the separate ports. The returns for the whole of the Union of South Africa, however, show the countries of origin in these two years to have been:

Imported from—	1912	1913
United States	$ 910	$ 2,175
France	788	1,007
Germany	3,874	3,991
Japan	2,643	4,696
Switzerland	1,363	749
United Kingdom	9,177	10,332
All other countries	311	750
Total	$19,066	$23,700

In 1914 silk hosiery imports into the Union of South Africa were valued a $36,878, but the shares of the various countries participating in this trade are not given in available returns.

The usual method of doing business is for the importer to have a branch office or buying agency in London or New York, through which all orders are executed. These over-sea representatives advance the cash to the manufacturer against shipping documents, making drafts upon the importer, with said documents attached. These drafts are drawn payable at sight, 30, 60, 90, or 120 days, as may have been previously arranged. A large proportion of the drafts are drawn at 90 days' sight. Should the importer desire to do business direct with the manufacturer, he will expect to give satisfactory bank references. In addition, R. G. Dun & Co. have branch offices in the principal trade centers of South Africa and are in position to supply the usual mercantile reports upon request lodged with any of their offices in the United States.

The two methods of distribution in general use in this country are, first, the appointment of some prominent importing firm as sole agents, the word "agent" in this case really meaning "importer"; and, second, the appointment of a manufacturer's agent, who will have the exclusive right to solicit business and who will receive a commission on all orders coming from his territory, whether direct or indirect. The word "agent" as used in the second sense means only that he is the authorized distributor of the manufacturer, hence his ability to induce sales rather than his financial strength is the measure of his value to his principal. It should be borne in mind that he never imports on his own account, and that all orders secured by him are filled either through the over-sea buyers of the importer or after definite arrangements for terms have been made between the manufacturer and the importer.

It is the opinion of experienced men that a specialty such as silk hosiery can best be handled through manufacturers' agents, as otherwise the sales would be limited to the one importer who might secure the agency. This is applicable to all articles of luxury, since the wholesale houses are engaged principally in supplying the country stores and would not for some years to come risk stocking silk hosiery. The names of prominent Cape Town retail houses handling hosiery may be had upon application to the Bureau of Foreign and Domestic Commerce or its branch offices.

Table of Gauges for Straight-Bar Bearded Needle Frames.

Gauge	Split Frames				Solid Frames			Three-Needle Frames			
	Needle leads & jacks in 3 inches.	Needles in 3 inches	Needles per inch	Solid Gauge Equivalent	Needle leads& jacks in 3 inches	Needles in 3 inches	Needles per inch	Needle leads& jacks in 3 inches	Needles in 3 inches	Needles per inch	Solid Gauge Equivalent
8	8	8	2⅔	4	8	16	5⅓	—	—	—	—
10	10	10	3⅓	5	10	20	6⅔	—	—	—	—
12	12	12	4	6	12	24	8	—	—	—	—
14	14	14	4⅔	7	14	28	9⅓	—	—	—	—
15	15	15	5	7½	15	30	10	—	—	—	—
16	16	16	5⅓	8	16	32	10⅔	—	—	—	—
18	18	18	6	9	18	36	12	—	—	—	—
20	20	20	6⅔	10	20	40	13⅓	—	—	—	—
21	21	21	7	10½	21	42	14	—	—	—	—
22	22	22	7⅓	11	22	44	14⅔	—	—	—	—
24	24	24	8	12	24	48	16	24	72	24	36
26	26	26	8⅔	13	26	52	17⅓	26	78	26	39
27	27	27	9	13½	27	54	18	27	81	27	40½
28	28	28	9⅓	14	28	56	18⅔	28	84	28	42
30	30	30	10	15	30	60	20	30	90	30	45
32	32	32	10⅔	16	32	64	21⅓	32	96	32	48
33	33	33	11	16½	33	66	22	33	99	33	49½
34	34	34	11⅓	17	34	68	22⅔	34	102	34	51
36	36	36	12	18	36	72	24	36	108	36	54
38	38	38	12⅔	19	38	76	25⅓	38	114	38	57
39	39	39	13	19½	39	78	26	39	117	39	58½
40	40	40	13⅓	20	40	80	26⅔	40	120	40	60
50	50	50	--	—	50	100	33⅓	50	150	50	75
60	60	60	—	—	60	120	40	—	—	—	—

The general state of trade in South China is usually measured by the cotton piece-goods trade. If this was the case in 1914 the trade of south Asia generally was poor, for the cotton piece-goods importers report the worst year in the history of the trade of the port of Hongkong. Stocks on hand at the beginning of the year were large, the heavy imports of the past two years having kept them far beyond the needs of the market. The year opened with comparatively poor prospects, though at times there was hope of quite a general clearance of goods on hand. Prices fluctuated and gradually dropped in sympathy with cotton, and when the war came the market practically collapsed. The demand for goods during the year showed little change from previous season. Gray 10-pound shirtings, Mexicans and similar goods, were rather in favor, but white shirtings and light-weight gray shirtings fell away from former trade markedly. There was some trade in fancy goods during the year, but the latter part of the year witnessed a collapse in this branch of the business, for most such trade was done by German houses on a credit basis, and the liquidation of German firms and stoppage of all such credit arrangements have stopped the trade. The worst factor in the piece-goods trade was the monetary troubles of dealers in the interior. Until Chinese money is on a more satisfactory basis, satisfactory trading, except upon a small scale and for immediate needs, is likely to be impracticable.

Dyeing, Bleaching and Finishing.

Do We Want a Coal Tar Chemical Industry?

"There is still, however, one serious obstacle in the way of the confident and determined development of the coal-tar dystuff industry on American soil, and that difficulty is the possibility, no, rather the certainty, that upon the resumption of normal international conditions, European manufacturers will endeavor by boycott, underselling, and other methods of competition, to win back this profitable market and put out of business a new and struggling dyestuff industry."

This statement was made before the Society of Chemical Industry, in session at New York on October 22nd, by Dr. Edward Ewing Pratt, Chief of the Bureau of Foreign and Domestic Commerce, in his address on the subject, "Do We Want a Coal-Tar Chemical Industry?" Dr. Pratt pointed out the efficient organization of the European coal-tar dyestuff industry, and particularly the German industry. He stated that "the German coal-tar chemical industry is probably the most highly and completely organized industry in the world. The industry invdlves not only complex chemical processes but elaborate and expensive plants. It requires the services of thousands of scientifically trained chemists and vast armies of workers. Not less highly organized is the commercial end of the business, devoted to merchandising the products of the twenty-two dyestuff factories manufacturing in Germany. Commercially, the coal-tar chemical industry in Germany is a unit. Prices, terms, conditions of sale, market competition, export policies are determined and fixed by the industry as a whole."

"Up to the present time, there has been no serious competition with the foreign coal-tar chemical industry. Any attempt to seriously dispute its dominance in other countries is persistently checked and prevented by the united action of European producers, by underselling and boycotts. Of the world's production of coal-tar dyes, valued at $92,150,000, Germany produced $68,200,000 worth, or practically three-fourths of the world's supply. Of the world's export trade, Germany has an even larger share, taking for herself over 88%.

Dr. Pratt pointed out that the United States has the raw materials, the markets, the technical skill, and the capital to develop this new industry, but he went on to cite specific examples of how the coal-tar chemical industry in this country had been throttled, and he cited an example of a company which had been organized in the state of New York "for the manufacture of organic and inorganic chemicals and its homologues and by-products. Although this company started with a capital of approximately only one-tenth of the United States' consumption, the European convention immediately announced their intention of putting us out of business as promptly as possible by underselling regardless of costs. Accordingly, they at once cut the regular net delivery market price of their exports to this country from 10-9/10 cents per pound to 9-9/10 cents per pound, and made secret contracts for sales in large quantities at far lower prices. Similar reductions in price had not taken place in other countries, the reduction here being made in the face of world-wide advance in the price of materials entering into the manufacture of aniline oil, in addition to the well-known advance in the labor involved in its production."

"Another American dyestuff concern reports a considerable list of colors, continued manufacture of which was rendered commercially impossible by the prolonged underselling on the part of foreign competitors at rates below the ordinary market prices of the wares in question."

After pointing out the serious effects of the European war upon the supply of dyestuffs furnished to this country, and the practical dyestuff famine which has occurred in this country, Dr. Pratt mentioned specifically not only the increase which has taken place in the production of dyestuffs by factories in existence prior to the war, but the fact that numerous new plants have been established.

"Five domestic concerns manufacturing dyestuffs have doubled their output. Another factory, the branch of a large German firm, has greatly increased its output. Still another factory manufacturing aniline has quadrupled its output."

"The great demand for dyestuffs has brought many new concerns into the field. There are now nine new plants making aniline and intermediates. Their total output is 18,000 pounds daily. One new plant for manufacturing dyestuffs, capitalized at $2,000,000, is now in existence and is producing at the rate of 1,000 pounds daily. Another plant will be ready for operation about November 1. Another company, capitalized at $15,000,000, has started plans for extensive work in different parts of the country.

"Our total production of coal-tar dyestuff materials at the present moment is probably over three times the production prior to the European war. In July, 1914, we were saving a scant 10% of the coke by-products by means of by-product recovery plants. Today we are saving not less than 20%."

"This matter has been thoroughly discussed by the officials of the Department of Commerce and the Federal Trade Commission and they have agreed substantially on these points, namely:

"1. That foreign concerns should be permitted to exercise no privileges in this country or against concerns in this country which are prohibited to domestic concerns. In other words, what we call unfair competition shall not be permitted any more to foreign concerns than to domestic concerns.

"2. That this or any new industry which aims to place us in an independent position industrially among the nations of the world shall be given a fair chance."

Dr. Pratt then raised the question of exactly how this was to be accomplished, by what methods, and by what legislation. He emphasized the idea that the legislation should be rather against the unfair competition than in the nature of tariff legislation, and instanced the experience of Canada, South Africa, and Australia, on these points.

He concluded with the following statement: "It is our

desire that the United States shall have independent and selfsufficient industries. I hope that the time has arrived when we can cast off industrial, commercial, or financial allegiance to any nation or any group of nations. I hope that the time has arrived when we can do away with our industrial crutches. I hope that the time has arrived when we can go forward into the world's markets, man for man, industry for industry, and compete fairly and squarely at home and abroad, and win."

NATURAL VS SYNTHETIC INDIGO.*

BY MESSRS. J. P. SRIVASTAVA, M.Sc., A.M.S.T., AND W. COLE, DYER, CAWNPORE WOOLEN MILLS.

Since the advent of synthetic indigo which has already played such havoc with the Indian indigo industry, much discussion has taken place as to the relative merits and demerits of the two kinds of indigo. The planter has more than once come forward with different pleas of the superiority of the natural product; he has tried to show that indigo produced in a factory *ipso facto* cannot be the same as that produced in the fields of Bengal and Behar.

The German manufacturer has, on the other hand, claimed a great many advantages for the synthetic indigo; he has been trying to convince the world that the indigo synthesized in the color works of Germany is not merely identical—as far as its composition goes—with plant indigo, but in several respects superior to the latter. After all, the best judge of the superiority or otherwise of the products is the user. It is his opinion which really counts.

In an article on *The Indigo Trade Revival,* published in the *Statesman,* (Calcutta) of November 14th, 1914, Mr. Bridgett has been bold enough to assert that natural indigo "makes the very best and fastest dyes, whereas the German chemical substitute gives a dull, dead color, which often washes out." The well-known chemical expert, Professor H. E. Armstrong, who happened to be in India at the time, wrote in the *Statesman* of November 17th, 1914, a rejoinder to Mr. Bridgett's article. Professor Armstrong pointed out how foolish it is to talk of natural indigo being so superior to the artificial product when we know for a fact that the natural and the artificial are one and the same chemical substance. It is ridiculous to talk of the real indigo "having the natural energy put into plant by the sun."

The same fact was emphasized a number of years ago by Alexander McRobert, who, in his address to the Upper India Chamber of Commerce, made it abundantly clear that the main and valuable constituent of both kinds of indigo is indigotin. He admitted that besides indigotin natural indigo contains in varying quantities the color-producing bodies, indigo-red and indigo-brown, and also that these substances probably exert an influence on the shade obtained with natural indigo. But he did not fail to point out that there are also present in all natural indigo mineral matter and earthy impurities which do not have any compensated advantage in dyeing. Sir Alexander went on to say that synthetic indigo was practically pure indigotin thinned down with water and, so on account of its purity and freedom from grit, it was preferred for certain purposes, such as calico-printing, even if the price was against it. In support of his contention, he had pieces of woolen cloth dyed with both natural indigo and synthetic indigo. These pieces turned out to be so alike that it was impossible to distinguish between them, except by the characteristic smell which the cloth dyed with natural indigo was found to develop on steaming. The cloth dyed with synthetic indigo did not give off any odor when steamed.

Sir Alexander summed up the whole thing by saying that the bulk of the consumers in deciding between the natural and the synthetic product would be influenced by price alone. It must be admitted that this prophecy has been remarkably fulfilled. Both madder and natural indigo have been ousted by the production of the synthetic substitutes at cheaper rates, though the fact that the synthetic articles are of standard strengths and consequently easier to manipulate has served as an additional inducement to the dyer in their favor.

Prior to 1906 no authoritative tests to ascertain the relative dyeing value of natural and synthetic indigo seemed to have been done. Being specially interested in the matter, Sir Alexander McRobert afforded facilities in 1906 to Messrs. Bergthiel and Briggs, experts of Behar Indigo Planters' Association, in carrying out a practical dye-test of natural and synthetic indigo in the Cawnpore Woolen Mills. The results of this test were published under the auspices of the Behar Indigo Planters' Association. The practical test (the report says) was preceded by a series of laboratory tests in which small quantities of wool yarn were dyed with various grades of natural indigo and with synthetic indigo under identical conditions, and the shades obtained compared. The results indicated that it was a matter of indifference what grade of indigo was used, and whether it was natural or synthetic, so long as the vats were worked under like conditions.

The practical test which was carried out with natural indigo in the form of paste (mal) and Badische Aniline and Soda Fabrik 20 per cent indigo paste, however, gave results quite at variance with those obtained by the workers in their laboratory trials. The natural indigo was found to dye a much deeper and fuller shade than the synthetic indigo. The Badische Company explained this anomaly by saying that the indigo supplied by them and used for the test was not suited for dyeing wool in the hydrosulphite vat, having been what they sell in the East under the name "E. Brand" specially for use in fermentation for cotton dyeing, and which is purposely admixed with notable amounts of alkali so as to facilitate reduction by fermentation. The Badische Company therefore claimed that the results obtained by Bergthiel and Briggs were inconclusive, and they themselves admitted this.

The tests described below were carried out by us at the Cawnpore Woolen Mills with a view to establish once for all by actual working scale trial, whether for the same number of indigotin units, natural or synthetic indigo dyes a larger amount of wool to a standard shade. The tests were made in the presence of Dr. Suter, Chemist to the Badische Company, Limited, Bombay, who supplied the synthetic indigo and Mr. Bergthiel, Chemist to the Indigo Planters' Association, Behar, from whom the natural indigo had been obtained. Both these varieties were in the form of a paste, the natural indigo paste having been specially pre-

*A paper presented to the Indigo Conference recently held at Delhi.

pared by Mr. Bergthiel with what he classed as a fine Bengal Indigo.

The two pastes were analyzed independently by us, by Mr. Bergthiel, and by Dr. Suter. The analyses were done by the potassium pemanganate method. Half a gramme of *dry* indigo (obtained by drying 10 grammes of the paste at 110 degrees C, till weight became constant) was sulphonated as usual. The sulphonated product was dissolved in 200 ccs. of water and after cooling poured into a 500 ccs. flask which contained barium sulphate freshly precipitated by adding sulphuric acid diluted to 10 ccs. of a 20 per cent solution of barium chloride. The solution was made up to the mark (500 ccs.) and allowed to stand overnight so as to let the sediment settle. The clear solution was then filtered, rejecting the first portions coming through the filter paper. 50 ccs. of the indigo solution, after diluting to about 750 ccs. in a large porcelain dish, were titrated against standard N-50 potassium permanganate. For purposes of calculation 1cc. N-50 potassium permanganate was taken to represent 0.0015 grammes indigotin.

The following percentages of indigotin in the two pastes were agreed to by all parties:—

Natural indigo paste supplied by Mr. Bergthiel..28.95%
Synthetic indigo paste supplied by Badische Anilin and Soda Fabrik.....19.71%

151¾ lbs. natural 28.95% Paste = 4393 indigotin unit.
223 lbs. synthetic 19.71% = 4393 indigotin unit.

Each of the above quantities of indigo was divided into 4 equal parts and reduced in casks, the reducing agents in each case being as follows:—

For natural Indigo.—
12 lbs. bisulphite of soda, 58°Tw.
9¾ lbs. zinc dust.
18 lbs. lime.
Synthetic Indigo.—
90 lbs. bisulphate of soda, 58°Tw.
7 lbs. zinc dust.
14 lbs. lime.

It was considered, owing to the greater purity of the synthetic, that the smaller quantities of the reducing agents would be sufficient to fully reduce the indigo and such proved to be the case.

Preparation of Wool.—The wool "Hill White" was thoroughly scoured in McNaught's wool washing plant and carefully mixed.

Preparation of Dye vats.—The dye vats were made up of bisulphite of soda, zinc dust and lime.

Dyeing.—The wool was dyed to a standard shade, and during the operations the vats were regularly tested for alkalinity with phenolphthalein paper and controlled by acetic acid and ammonia.

After the vats had been exhausted as far as possible, it was found that the following quantities of wool had been dyed.

With natural ....2,352 lbs.
With synthetic ...2,382 lbs.

The dyed wool was in both cases carefully batched, carded and combed in exactly the same way and samples taken for exhibition. Smaller samples of these were taken and scoured with soap and soda. The natural indigo dyed a slightly darker shade and suffered slightly less loss of color in washing with soap and soda. The synthetic indigo dyed a more bloomy shade—but the bloom washed out—and also dyed 30 pounds or 1.2 per cent more wool, which is, however, easily within the limit of error. The difference might just as well have been the other way about. Had a violet natural indigo been employed its bloom would have been permanent.

These trials show that so far as the dyer is concerned indigo, whether made synthetically in the factories of Germany or produced in the plantations of Behar, is very much the same. The quantity of wool dyed by the same number of indigotin units in both cases is practically the same. It is true that the natural indigo in our tests dyed a slightly darker shade than the synthetic product, whereas, on the other hand, the latter gave a more bloomy shade; but both these advantages were lost on scouring and milling.

The dyed wool on being in each case carded, combed, spun, woven, scoured and milled gave cloths which could not be distinguished one from the other by two independent judges. The synthetic indigo dyed a more bloomy or purer shade of blue, owing undoubtedly to the greater purity of product, though even the synthetic product is now apparently being admixed with red indigo and other compounds found in natural indigo so as to imitate the latter as completely as possible; but as remarked above the red tone washes out. Not so very long ago synthetic indigo used to dye a rather dull and slightly green shade of blue. This is not the case with more recent supplies, and may probably be accounted for by small quantities of indigo-red which the manufacturers have learnt to add to the indigotin proper.

It must be admitted that synthetic indigo presents certain advantages to the dyer over the natural product. The former is more easily reduced and yields a shade which does not vary with the origin or quality of the product. The amounts of reducing agents required for the synthetic product are appreciably less than those required for the natural indigo. Then, there is the difficulty of getting a perfectly uniform quality of natural indigo and the consequent necessity of controlling all purchases by careful chemical analysis. For the dyer, Mr. Bergtheil's paste was a distinct improvement over the cake, inasmuch as it did away with the necessity of grinding which is a slow and tedious process.

THE INDIAN INDIGO INDUSTRY.

A very interesting paper entitled "The Indian Indigo Industry," by Dr. F. Mollwo Perkin, was read before the Indian section of the Royal Society of Arts, London.

Dr. Perkin pointed out that great changes had taken place owing to the war. In consequence of the cessation of the supplies of synthetic indigo, which was a German product obtained entirely from that country, Indian indigo was now at a premium, but unfortunately it was only possible to obtain it in comparatively small quantities, and this was causing great inconvenience to the dyers.

Indigo, being the fastest of blue dyes, and having peculiar properties of resistance to light and weather conditions, was used in large quantities for dyeing the cloth used in making the clothing of sailors and also for dyeing serges in general.

In 1895-96 the total value of plant indigo produced was £3,566,700, and the acreage under cultivation 1,339,099 acres. Last year, owing to the competition of synthetic indigo, the value had fallen to £60,000—£70,000, and the

total acreage under cultivation had decreased proportionately.

The author then dealt with the cultivation of the indigo plant, its several varieties and processes of treatment, afterwards passing on to synthetic indigo, stating that in 1898 this was placed on the market at a price which enabled it to compete with the natural product. This resulted in cries of help from the planters, and fevered efforts were made to improve the methods of manufacture. Like most fevered efforts they were unfortunately spasmodic. Nearly 20 years had been employed in developing the synthetic process and nearly £1,000,000 sterling had been spent before a pound was placed upon the market. If, during that time, patient research had been carried out in India there was very little doubt that the process would have been improved and larger yields of indigo obtained per acre of land cultivated.

The Germans were not content with manufacturing synthetic indigo. They also experimented with the best means of reducing it and preparing a good working vat. Indigo itself did not dye, because it was insoluble in water. If, however, it was reduced, the blue color vanished and a pale yellow solution containing indigo white was obtained. On exposure to air, oxygen was absorbed and indigo blue again obtained. If wool was steeped or passed through this vat and exposed to the air, the indigo white was oxidized *in situ* and the wool became dyed blue. The Germans, therefore, carried out research in order to find the best vats which could be used with synthetic indigo. Having found them, they not only supplied the indigo, but also sent their chemists round to the dyers to show them how to make and use these vats.

Now the question arose—and it was one of the greatest interest to those who were present—was it possible to save the Indian indigo industry? At present they were at war with Germany, the producer of the synthetic indigo. How long that war would last it was impossible to say, but, in the meantime, dyers were crying out for indigo. The present quantities of natural indigo were wholly inadequate to satisfy the demand. Were the planters prepared to largely increase the acreage under cultivation? He understood that the attitude of the Indian planter was, "If I cultivate more land for indigo, increase the size of my factory, and sell at good prices during the war, what about after the war? Will the Government and will British dyers guarantee to take the natural product when they are offered the synthetic?"

An appeal has been made to the Government to use only Indian indigo for the dyeing of all Government contracts. Although he was in complete accord with the objects of this petition and hoped most sincerely that the Government would see their way to employ the natural product for dyeing the uniforms of Government servants in the army, navy, post office, the police, etc., he must, as a chemist, take exception to the expression, German chemical substitute. Synthetic indigo was not a substitute; it was precisely the same indigotin as that obtained in natural indigo. Nor was he prepared to agree that synthetic indigo was poisonous. He thought it was a great pity that these two irrelevant statements had been made.

Personally, he believed that for many classes of material better results were obtained with natural indigo than with synthetic indigo.

Important points which might even at this late hour help to prolong the life of the industry might be summarized as follows:—

(*a*) Selection of seed and the propagation of the qualities which yield the highest percentage of indigotin. In this connection it must be remembered that one seed is best suited to one district and another to another district, owing to differences in the soil and climatic conditions.

(*b*) Chemical improvements in the manufacture. These must not be carried out haphazard, and if results are not immediately shown the planters must not get impatient, and after a short trial say, "What good are you doing?" and get rid of the chemist. Remember the 18 years and the huge sums of money spent, and the patient work of the German chemists before they were able to produce synthetic indigo.

(*c*) Economy in management.

(*d*) Agricultural experiments with different fertilizers and the rotation of crops.

In conclusion, he felt constrained to say that in his opinion the Government should insert a clause in all their contracts where indigo blue was to be employed for dyeing that only natural indigo should be employed. If after a few years' trial it was found that the indigo planter was unable to meet the demand, and if it could be proved that better results could be obtained with synthetic indigo, then the natural indigo industry—like the natural alizarin obtained from the madder plant—must cease to exist.

Unless the manufacturers of natural indigo were prepared to work on scientific lines in all-round improvements of the methods—agricultural and chemical—he saw no possibility of increasing or even retining the industry.

WATERPROOFING FABRICS.

This is an improvement on the process of waterproofing, in which the fabric is impregnated with insoluble gelatine. Bichrome and an excess of sulphurous acid are added to the gelatine solution. The sulphurous acid prevents the bichromate from acting on the gelatine while in the bath, but when the fabric is dried the sulphurous acid disappears, and the bichromate renders the gelatine insoluble. Soap may be added to the bath in order to improve the premanence of the waterproof finish, and impart a good handle to the goods.

The treatment, which forms the subject of English Patent 24,714—1913, may be carried out as follows:—30 kg. of gelatine are dissolved in a bath brought up to 90 litres with water, or, if soap is to be subsequently added, the bath is brought up to 80 litres only. 1½ litres of commercial bisulphate of soda and 250 c. c. of hydrochloric acid are successively added, and then 10 litres of water, in which 400 grammes of bichromate of potash are dissolved. The bath is slightly heated in order to ensure a thorough combination, which can be recognized by the blue coloring of the bath. The excess of acid which the bath contains renders it possible to add a certain quantity of soap without producing a precipitate, and if soap is to be used, 500 grammes are dissolved in 10 litres of water, and added to the bath before the fabric is put in. The fabric is boiled in the solution and after drying at a high temperature, a metal soap will be produced on the fibre owing to the combination of the soap with the chromium salt.—*The Dyer and Calico Printer.*

Dyestuff Trade Conditions.

The condition of the dyestuff situation is discussed by the Cassella Color Company in a recent issue of their publication "Dyestuffs" in which they comment as follows:

The National Exposition of Chemical Industries held in New York during the week commencing September 20th, with its promising and interesting exhibit of accomplishments during the past twelve months in the manufacture of dyestuffs, deserved and has received unusual consideration and the attention of textile and other consumers of these products. But probably the most interesting exhibit to be found there was the frank and modest statement regarding American manufacture by the Benzol Products Company, the largest producer of aniline oil today in the world. A statement from such a source is worthy the attention of the trade and consumers generally, and we quote therefore as follows:

> "The manufacture of dyes is necessarily complex and involved and must be a development of slow growth. It would be easier to organize an army of a million men or a navy of a thousand vessels than to build up at short notice such an industry as the Germans have developed for the manufacture of coal-tar products. We have the men and the means to do the one, but to do the other requires a special force of men trained in universities and technical institutions. Such men must have specialized in the chemistry and technology of dyes, and have supplemented their academic career by practical experience to fit them to design and develop the apparatus necessary for the complicated scientific operations involved. The United States of America have not thus far given much opportunity for such workers."

I. F. Stone, the genial president of the National Aniline and Chemical Company, in his address delivered at the National Exposition of Chemical Industries, takes the German producers to task for having failed to ship to this country larger quantities of goods during the early months of the war when shipments were permitted through the British lines. His words are these:

> "Had, however, the German firms taken advantage of the time when they could make shipments, and had sent to this country a large supply of their products, their agents here could have accumulated large stocks which would have carried them over a long time, and so largely prevented the acute shortage of the present time; but for reasons best known to themselves they decided to ship to this country each month only about 75% of their regular normal shipments. Consequently, a shortage of at least 25%."

The origin of Mr. Stone's figures are not revealed. His statement of importance is that which reflects upon the attitude of the producer, and in this Mr. Stone has confused the attitude of the German Government with that of the German producer. The export of dyestuffs was placed under an embargo by Germany in order, primarily, to safeguard its supply of munitions. The allotments granted for export were arbitrarily made by the same authority. The producer was without power to control the situation, and as is well known to every large importer, the producers worked earnestly with the importers to safeguard the needs of the American textile trade.

The Cameron Principle of Cutting Fabrics.

In the development of the textile industry the cutting of wide fabrics into narrow strips has been made necessary in order to supply a variety of wants. In this way the cutting process which would ordinarily be considered of trifling importance, has grown into an operation involving considerable expense to a number of industries allied to textile manufacturing.

Before calling attention to what is the latest development in appliances for cutting fabrics it will be of interest to give a description of the various methods by which this work has been done. One operation of limited application consists in strip cutting by hand with the aid of a straight edge and knife.

Another simple operation of cutting cloth into strips is often employed in the clothing industry and consists in the use of an electric cutter or shears.

A third method consists in putting a full piece of cloth under a guillotine press and cutting the goods into strips.

These methods are, of course, unsuited for doing the work on the large scale required in modern industries, being both wasteful and inaccurate. The need of a more economical process has led to the development of cloth cutting machinery, of which there are a number of types, each marking a step in the development of the process. They may be divided into two classes, the first of these consists in the use of a stationary blade against which the cloth is drawn, thus cutting it into strips. This process is objectionable because the edges of the cloth are very liable to ravel. Moreover, the blades quickly become dull by contact with the goods and then the cutting process is converted into a tearing operation.

Another method is the use of discs made of thin steel revolving at high speed and adjusted so as to cut the strips to the desired width. The cloth is cut as it is drawn under the discs. While this is an improvement over the previous method, it is open to the same objection, that the cutting edges soon become dull. Furthermore, there is the danger of injury to the operator.

Another method consists in the use of a revolving shear. Two cutting discs overlap each other slightly so that the cloth is cut by a shearing process as with a pair of scissors. While this is another step in advance of the methods already described, it is open to the same objection, that the cutting edges soon become dull and then the cloth is torn instead of cut. Moreover, it is necessary to keep all of the discs exactly of one size, otherwise some will cut faster than others, causing the cloth to wrinkle and make bad work.

The disadvantages inherent in these various methods of cutting cloth into strips has led the Cameron Machine Co., Brooklyn, N. Y., to develop what has become generally known as the Cameron principle of cutting cloth. They employ in their slitting and rewinding machines a combination of new principles, and instead of cutting the goods with a keen edge of any kind, they press metal discs, having an edge much like an ordinary cold chisel, but circular in shape, through the fabric at the point where the goods are to be severed. The "cutting wheel" has a V-shaped edge and is mounted on a ball bearing so that it can be revolved freely. It is pressed by a spring against a polished steel roller. In this way the cloth is divided by a clean cut.

The edge of the strip is clean, smooth and free from fraying, as the operation tends to press the edge of the fabric so as to prevent the raveling of the warp. This method has many novel features and is patented here and abroad.

In developing the Cameron machine it was found that manufacturers of broad silks, huck towels and other fabrics have for years faced the problem of separating wide webs made with doups or selvages into narrow strips. This work was done by hand, the results being very unsatisfactory. In order to meet the special requirements of the process, this company designed the pendulum cutter, which has given very satisfactory results.

Practical Problems Discussed by Cotton's Readers

We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so indorsed. This department is open to all. Suitable letters are paid for in cash.

Flyer-Lead Frames, What About Them?

EDITOR COTTON:

For some time I have been anxious to get every new issue of COTTON, expecting to see a reply to "Wash" regarding the flyer-lead frame being the best type.

I am willing to admit that I am no expert around fly-frames, however, I am greatly interested in this question. Is "Wash" right?

If silence counts for anything we must admit that he is right. Therefore, we have a sad condition of affairs in our cotton mills, and this in the year 1915 when the claim is made that the mind is more active than ever before. The way I see it, if "Wash" had offered $50,000, no one would be any nearer capturing the prize. It is therefore a pity that our mill men and builders must bow their heads to this awful mistake in a change of system, which no one is able to defend or explain, but which seems to admit that the bobbin lead strains the strand.

For some time I thought "Wash" all wrong, but after considerable study I arrived at the following conclusion, viz., that owing to the bobbin having an excess speed, all the power to drive it must come from the cone belt. This is enough to prove that the connections of the bobbin and spindle by the use of the compound is of no benefit as far as taking any work from the cone belt is concerned. They tell us in the textile schools, that the jack-shaft removes a part of the load from the cone belt. This was my belief after graduation, but since reading "Wash's" challenge and looking into the matter, I must admit that he is right. How can the jack-shaft aid the cone belt when the speed of the bobbin is at all times greater than that of the spindle? This alone is enough to convince any skeptic on this point. No one can deny that a fly-frame is made up of two speeds, but you can find the excess speed over the spindle only on the bobbin lead from which it derives its name.

Another way to put it, how can the spindle speed aid the bobbin, when the bobbin travels at all times during winding at a greater speed than the spindle?

On the other hand, we must admit that in order to strain the work the cone must be driven at an excess speed and that any hesitation of the bottom cone will cause slack. So there we have it. "Wash" is right as far as I see it and if I am wrong I would appreciate having some one correct me. I want to learn all I can, and I hope the readers of this department will not let me go wrong if they can correct me.

Tab (Mass.)

Testing Sized Warps for Moisture.

EDITOR COTTON:

I have often been asked the question, how dry should we dry our warps on the slashers in order to get the very best results in weaving? I was once told that I must know how to feel the warp so as to be able to tell when it was drying just right, and that it took long experience in slashing to be able to do the trick. All of which is quite wrong as anyone can, by testing for moisture, tell accurately just how dry the warps should be made on the slasher cylinders, and can set the steam pressure for the required dryness in a moment's time.

All slasher rooms should be equipped with a small drying box equipped with a lid, having a coil of steam pipes in the bottom and large enough to hold at least one pound of warp. If suitable equipment is not at hand for the test, we can resort to the crude way of weighing, say, 5,000 grains of warp raw from the section beam as it comes from the warpers and place it on top of boilers for two hours, or until good and dry. Then weigh it again and you will find the percent of moisture in the warp before slashing.

Then treat likewise a piece of sized warp which will readily show the moisture in the finished warp and by noting the steam pressure used while slashing the warp being tested, this pressure can be easily regulated to suit the requirements at hand.

Warps should always finish with as much moisture as the raw warp had and my tests have shown that for the best results, they should finish with about 2 percent more moisture than the raw warp had before it was slashed and dried.

I do not personally know the limit of moisture which can safely be left in the warp without danger from mildew, but I have secured fine results from warps which tested as high as 4 percent more moisture in the finished warps than I had in the raw warps before they were sized.

W. L. (Georgia.)

"The Organization that Developed Air Conditioning," is the title of a 20-page illustrated booklet which the Carrier Engineering Corporation, 39 Cortlandt Street, New York, is sending out to exploit its facilities and the experience of its staff in designing and erecting apparatus for washing, cleansing and purifying of air and the regulation of humidity and temperature. A list of over fifty industries in which this organization has served clients rated at over $1,000,000 each is included.

Why Spinning Rings Wear.

EDITOR COTTON:

I note in your issue of September, 1915, where "Wash" of Massachusetts answers the question: why spinning rings wear out quicker in some mills than others.

Having been in ring spinning and handling some of the largest rooms south and east for several years on counts from 3's to 80's, I take pleasure in discussing this question just a little further. "Wash" seems to lay the trouble wholly to light travelers allowing the yarn to whip against the separators. This has very little to do with the wearing of rings and hardly touches the question. I admit that too light a traveler is detrimental to the life of the yarn if allowed to balloon out against the separators, but the ring suffers very little, if any, on account of this.

If "Wash" will go in a spinning room where the rings are worn and examine the rings where there have been separators and no separators, he will find the rings to be worn in the same way. Some will be worn on the side, back and front. Now "Wash" should know this is caused by the spindle being out of the center of the ring. This does not answer the question, for this applies to all mills. The weight of the traveler has nothing to do with the wearing of the ring. The speed of the traveler is what plays havoc with the ring. "Wash" ought to know a frame on 40's yarn with a spindle speed of 1,100 using a number 12 traveler will wear the ring out in three to four years, whereas I know of mills running coarse yarns on low spindle speeds, where the rings are in fair condition after eight years of service.

A spinner who would run a traveler light enough to allow the yarn to balloon against the separators and retard the traveler sufficient to wear the ring, I do not believe he could hold his position long enough to do much damage unless the mill was in the waste business.

In starting new rings with a lighter traveler than is required after the ring becomes polished, is a practice spinners have always followed, but it only takes a few days to polish a new ring, the traveler should be changed every three or four days on new rings, and in the course of two or three weeks the proper weight traveler can be applied with no further trouble more than the regular changing.

M. J. J. (Georgia).

The Searchlight Company, Chicago, Ill., with southern offices at Atlanta, Ga., has recently issued two new booklets. One of these is devoted entirely to welding and cutting and gives in detail the general principles involved in the oxy-acetylene process of welding and cutting. This booklet describes the outfit which has proven to be satisfactory during the nearly two years of continuous use in their own factory and which they are now offering the public. The other booklet is the Searchlight treatise on acetylene and deals with the problems of the production on a commercial scale of compressed acetylene gas. Either or both of these books may be secured by applying to the Searchlight Company or its branch offices.

If you want to know all about Protection vs. Free-Trade send a postal card request for free sample copies of The American Economist, 339 Broadway, New York.

The Labor Bureau vs Individual Effort.

EDITOR COTTON:

"Student" and I have been holding quite some discussion over our views relative to the advisability of an overseer chasing about the city nights looking for help. It appears to me, however, that "student" is indivdualizng his argument when he is obliged to single out one or two cases where he was furnished with help and after a trial found them to be inefficient. He says he then went about the city and found men that were better qualified. The fact that he chanced to single out a better man is no argument against a labor bureau. Why, only the other day a man who has been overseer of spinning for 36 years wanted a 10-side spinner. Before the labor bureau located one, he had located one himself and immediately telephoned the labor bureau to that effect. The girl claimed to be a 10-side spinner but before noon the overseer found that she was nearer a 4-side spinner. Still, the overseer hired her himself, and according to "Student," an overseer knows better what to do than a labor bureau. I see little satisfaction in arguing this point, for as long as a mill is a mill you are bound to get people you don't want. The only remedy is to discharge them as soon as you find it out. Therefore, I say, for "Student" to single out one case where he was supplied with a hand that he could not profitably use, is no argument against the principle advanced. I have seen a master mechanic hire an experienced lathe hand and to his sorrow find, two hours afterward, that the man was little more than a machinist's helper. He undoubtedly would have found out sooner if he had not had occasion to be absent from the shop for a time.

"Student" undoubtedly is aware that I sign my name to my letters and let me suggest that I, as well as others, doubtless, would be pleased to have him do likewise, for there are those of us who are anxious to meet the man who holds the biggest spinning job in Rhode Island and still entertains such ideas on hiring help.

A. M. Oliver (Manchester, N. H.)

[Note. It is the personal privilege of contributors to this department to remain incognito to all except the editor. This is frequently necessary for obvious reasons.—Editor.]

Those old-fashioned manufacturers who are still using tallow as a softener, would be greatly astonished at the superior results obtained with soluble softening oil made by the Arabol Mfg. Co., 100 William St., New York City. They would be struck by the smooth finish of the warps, the easy parting of the threads in the lease rods, the clean and bright appearance of the slash cylinders. They would find soluble softening oil in the same condition at all seasons; sweet, pliable, winter and summer. It is neutral and easily handled. With close woven goods, such as corduroys, velveteens, sateens, umbrella goods, cambrics, etc., it gives especially fine results.

Courtesy costs nothing. It's a matter of a few well-chosen words and an interested manner. The voice, the expression, have everything to do with it.

Taxes are local, state and government; likewise personal.

Hiring Help for the Hosiery Mill.

EDITOR COTTON:

One great question that often arises is, what class of girls are fit for work in a hosiery mill?

The best results are obtained from help which has been hired by one who understands human nature as well as knowing just what class of work he wishes the applicant to do.

For the knitting department try to select a good appearing applicant. Then notice whether there is any defect in her vision, and if she appears nervous in conversation. A good bright girl about 16 years of age makes the best operative, or at least that has been my experience. Explain to this girl just about what you expect her to do, and make her feel at ease. Ofttimes a gruff remark is the means of losing a very bright prospect.

Regarding the vision or eyesight, it is not advisable to hire a person with defective eyesight for the knitting or looping departments. It is a known fact that under the best conditions, there is a decided strain on the eyes or optic nerves in these departments, so it is advisable to note or inquire as to the condition metioned.

After engaging new help, girls, principally, if they be inexperienced, have an instructor, or take an experienced operator, one who is dependable and is doing good work herself, to teach the new girls. It is a good idea to go around and speak to a new operator, and inquire how she is getting along, and if she likes her work. Ask her what she doesn't understand or what she would like to know, and then make an effort to show her. One thing to remember is this, try to keep a girl after you have engaged her, if she is any good at all, as each dissatisfied beginner that leaves is very apt to tell others that so and so is no good, or that it isn't a nice place to work.

Try to keep a class of help to whom you are not ashamed to say good evening when you meet them on the street and are accompanied by your wife. Good clean help means good clean work.

Keep the mill clean and sanitary. The help will appreciate this, their health will be better, which means better attendance and more contentment.

Like all working classes, it is known that there is a class of operatives called "floaters," or in other words, a class never satisfied, always changing, first at one place and then somewhere else. These people are of no benefit to an employer or to themselves. I find it best to ask the applicant where she worked last, or where she has worked and how long at each place, get the names of the former places and inquire what was wrong. Very often, I believe, when mills need help badly they are a little careless about finding out these little valuable things, but try it and see if it doesn't pay.

At times girls will leave on account of unfair treatment from some of the other employees. Ofttimes a fixer will hold malice against an operator because she doesn't know as much as he does, instead of trying to assist her or showing her where she is wrong. Under such conditions it is best to get rid of the fixer, as he is merely one and may be the means of losing a lot of other good help.

So many manufacturers do not trouble themselves to pay an occasional visit to their work rooms, leaving it to the ones in charge. This seems going it blind, and I would suggest that they get familiar with the details in general. They will be better placed to suggest any changes or to see for themselves the conditions. The writer has had experience in the hosiery business for a good many years, and it is hoped these lines will be of benefit to those interested in the progress of their trade. "Bob" (Iowa.)

Figuring the Price Per Hank.

EDITOR COTTON:

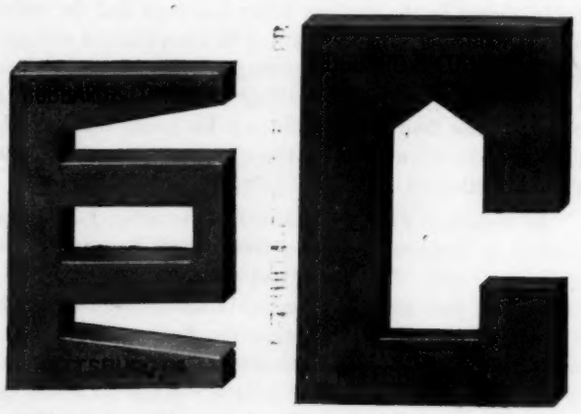
I wish to ask a question in the Practical Discussion Department and will appreciate having your readers answer it for me.

How do you figure the price to pay per hank? Say you are paying 10 cents per hank for 4.00 hank roving on 140 spindles, what price would you pay for 168 spindles on the same hank roving?

Also, if you were to pay .1325 for 12 hank roving on 192 spindles, what should be paid for 15 hank roving on 192 spindles? Inquirer (Maine).

Quality Baling Buckles.

A very essential feature of cotton mill cloth room work is to have on hand suitable bale buckles. Particularly is it necessary to have buckles that will not become unlatched when goods are being baled for export as numerous reports have been received from Government Commercial Agents and others of seeing American goods landed at foreign ports with one, or frequently several, of the steel bands which hold them into shape lost entirely and the package in bad condition in consequence. Careful attention to the selection of the buckles that fasten the steel bands on



the bales would prevent difficulties of this character. Illustrated herewith are two styles of baling buckles manufactured by Hubbard & Co., Pittsburgh, Pa. The stamping department of this company produce over four hundred tons of baling buckles annually and keep on hand fifty tons of available stock at all times. This company invites inquiries with a sample of the buckle desired or a sketch and if they have nothing already in stock, they will be glad to quote prices on special buckles to suit the customer.

The Fortsmann and Huffman Co., woolen manufacturers, of Passaic, N. J., have just let a contract to John W. Ferguson Co., Paterson and New York City, for the construction of a new building at the main plant in Passaic. This will be of five stories, 54 by 280 feet, the interior construction being of reinforced concrete, with brick and limestone walls, and an architectural terra cotta front.

Some Comber Parts and Their Work.

EDITOR COTTON:

For the benefit of the readers of your Practical Discussion Department I wish to discuss the object, performance and result of a few of the principal parts of a comber starting with what is commonly called the feed roll, I think this is the first mistake, as the real feeding roll is the first to act on the fibers, which is the roll or rolls commonly called lap rolls, but in calculations the lap rolls are called feed rolls. I have seen a student in one of our leading textile schools get confused on a draft calculation for this reason. He was told to assume the delivery roll to be a driver and multiply all driving gears together from the delivery roll to the feed roll, together with the diameter of the feed roll, for a divisor, and multiply all driven gears together, with the diameter of the delivery roll, for a dividend, and when he came to the solution he naturally had ¾ inch feed roll instead of the 2¾ inch lap rolls.

However, for convenience in this article, I will call it the feed roll, and having dealt with the time of feeding and the result in a previous article, I will now take the amount fed forward by the feeding roll which is regulated by a change gear called the feed gear ranging from about 12 to 17 teeth and a driver in most cases, driving the gear on the feed roll, the principal reason for making this change is to increase or decrease the weight of sliver or production, as the more we feed the more we deliver, providing we take out the same percentage of noil. But sometimes this is changed for other reasons, for instance, the writer had trouble with the cotton tending to come up behind the nipper knife, owing to the settings being too close and the weight of lap too heavy, and not desiring to open out the settings I found that by lightening the weight of the finished ribbon lap about 60 grains and making it up on my comber by changing the feed gear, I did not have any more trouble on that account and made the change without decreasing the production.

In regard to the first reason for changing, I have been present at disputes regarding the effect it had on the percentage of noil. So I put a test through, first putting a 13 tooth feed gear on and running it again and then taking the percentage. Then changing the feed gear from a 13 to a 15 gear, I also took the percentage and weighed the sliver. The results were as follows: The 13 tooth gear gave a 64 grain sliver and 20 per cent noil, and the 15 tooth gear gave a 74 grain sliver and 20½ per cent noil.

Before putting this test through, I, like many others, used to think when changing the feed gear the percentage of noil remained the same knowing full well that the noil itself, (but not the percentage of noil) weighed more, as in order to retain its prevailing percentage as the sliver increases in weight by changing the feed gear the noil must increase accordingly.

Sometimes the sliver might be running heavy for other reasons such as the roll not getting the benefit of the weight, or a small roll of cotton or lap on the roll. I have seen these laps run all the week in some mills, causing heavy slivers and affecting both draft and percentage until they were cleaned off on Saturdays.

Another evil I have proved to my own satisfaction is that the amount fed has an effect on the piecing, not noticeable unless you make a great change say from a 16 to a 12 feed gear. The following rule shows the amount fed forward at each nip by the feed roll to be about 15/100 of an inch. Rule: Multiply the revolutions per minute of the cylinder shaft per nip by the driving gears from the cylinder shaft to the feed roll by the circumference of the feed roll and divide by the driven gears.

Example: What length would be fed forward per nip if cylinder shaft makes one revolution per nip, then a 1 to a 5, then a 14 change gear to a 44 on the feed roll, the diameter of the feed roll is ¾ inch. Solution:

$$\frac{1 \times 1 \times 14 \times 75 \times 3.1416}{5 \times 44} = .149 \text{ or } .15$$

of an inch. So in using a change gear a change of 1 tooth equals a trifle more than one 14th of .15 or about 1/100, and a change of 4 teeth equals a little more than 4/100 parts of an inch. Now when it comes to dealing with the piecing of the web on a comber, 4/100 of an inch sure is some overlap to lose, especially when there is no necessity for it.

The piecing, as I stated in a previous issue, is governed by the amount that our newly combed heads overlap our previous combed tails, but, bear in mind, I don't mean to say the greater the amount the better the piecing. In fact I have always secured good results by having the least overlap possible and still get a good piecing. The rule generally known is the closer the difference between the time that the segment strikes the leather roll, and the time the forward movement of the steel detaching roll starts, the better the piecing. The reason for this is that the steel detaching roll governs the amount of overlap. It's this way. After the needles of the half lap have passed combing the newly combed heads, the tails of the previously combed fibers are brought backward into position to be pieced. The newly combed heads are raised by, and resting on, the segment. When the high part comes in close proximity to the leather roll they bite or grip the heads and pass them forward, we will say, until the heads touch the tails, which occurs at about 7½ on the index as can be proven by stopping a comber at the stated time and taking out the leather roll without disturbing the fibres. We would find that the heads touch the tails a little short of 5/16 of an inch from their ends. So if we should change the detaching time, say, 2 teeth later, it would bring or detach our tails about 3/32 of an inch forward, and with the heads remaining in the same place, reduce the overlap 3/32 of an inch, consequently weakening the piecing.

We are now detaching at about 6¾ or 7; now loosen one cam and detach it one tooth later, run it and note the difference. Stop it and detach another tooth later and so on until we get about eight when it gets so weak it makes a complete break.

In explaining why and how the piecing makes a complete break, the time that the segment touches the leather roll which holds and later passes the heads forward is constant, and whenever we have a weak piecing through too little overlap between the tails of the first fibre and heads of the second, the tail if the second will be opposite, as in this case; the surface distance of the steel detaching roll is always the same and if we allow half of it to go by before we put the fibres onto it, they will only be carried half the distance forward that they should be; then, when the backward motion comes, they will be carried backward too far and have

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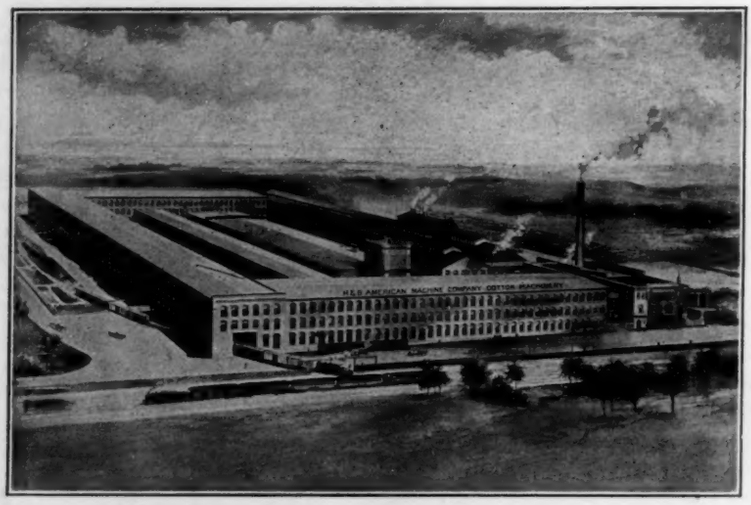

Spinning Room Machinery

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With Band or Tape Drive

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too much overlap, until the overlap increases to the point where it will detach the head of the first and second in one detachment leaving none to detach for the next. For instance, take two fibres one to be detached at one detachment and the other at the next; if we should overlap them too much, putting the second head into the bite of the rolls with the first head, they will be carried forward together.

In regard to the setting of the feed roll, the writer has asked quite a few whose business it is to set this roll, why they set at certain distances, and it is always because somebody told them to, or somebody recommended it. When asked why they set the front of the feed roll to the back of the detaching roll, one old comber man replied, "we should always have the distance from the center of the feed roll to the center of the steel detaching roll greater than the length of the staple being used," which is radically wrong. Although we set the front of the feed roll to the back of the steel detaching roll, they have no direct connection with each other, and the only reason for doing so is that of convenience, because by setting the front of the feed roll to the back of the steel detaching roll is equivalent to setting the front of the feed roll to the front of the leather detaching roll, as the front of the leather roll rests on the back of the steel roll, and instead of setting the feed roll to the steel roll as many seem to think, they are really setting the feed roll to the leather detaching roll. These have a direct function to one another and providing they are the same diameter, from the front to front equals center to center. But here is the evil. As they are not the same diameter the only way of providing for the difference is allowing in the setting. The feed roll in most cases is ¾ of an inch or 75/100 and the leather detaching roll is 89/100 a difference of 14/100. The rule generally used for getting center to center of two rolls having different diameters when setting with a common gage is to increase the length of the gage half the difference of the rolls which in this case is 7/100 and the gages generally running in sixteenths of an inch we should increase at least 1/16.

For example, when running a 1 5/16 inch staple we should set about 1 13/16 inch, and this setting should be changed only as a last resort to get percentages. Now let us see what we must provide for: in 1 5/16 inch staple there are 21/16 and we must allow about 3/16 so we won't feed non-combed fibre into the jaws of the detaching roll and segment, at least 1/16 for the difference of the two rolls and about 4/16 for the bulk of the lap, requiring a setting of 29/16 or 1 13/16 inch.

L. C. (Rhode Island.)

Some Questions on Roll Setting.

EDITOR COTTON:

I should like to have the opinion of several good cotton mill men on roll setting. I should like the setting in the card room from the drawing frames (4 sets of rolls) through slubbers (3 sets), intermediates, fly and jack frames to the spinning frames. I should particularly like to hear from the one who signs himself "Wash" (Mass.)

Will you please take this up in your "Practical Problems" department? Student (N. H.)

The Five Dollars Not Yet Taken.

EDITOR COTTON:

The more perfect the winding, the more perfect the roving produced.

It is easily proven that the bobbin-lead fly-frames do not wind the roving perfectly. This is proven by the following simple test: Stop any bobbin-lead fly-frame, raise the bobbin gear and turn it backward one-half or a whole turn (the amount depending on the size of the bobbin), so as to cause slack; next start the frame again, and it will be found that this slack is immediately taken up. This proves conclusively that stretch takes place on all the other ends while this slack is being taken up on this one end.

Are we not face to face with a great problem? What is the use of employing efficiency engineers to find defects, when we have one on all bobbin-leading fly-frames that is staring us in the face every day? I for one have done my share to point out the great mistake that was made in the past. Why is yarn weaker now than in time gone by?

Take the English tables for the breaking strength of yarn, that were compiled from the breaking strength of yarn made from flyer-lead frames, compare them with those on this side of the water, and where are we? We are "in bad," simply because we adopted a fly-frame that strains the roving of every set turned off when making a hank roving five-hank or under. On fine work the roving is generally strong enough to reduce the diameter of the bobbin to suit the outline of the cones as it builds, this is due to using better stock which is generally the case when making a five-hank roving.

The winding-on is often puzzling even to practical men, something I could never understand, because it is simplicity itself. Let us consider the spindle and flyer as standing still, and that the roving can be drawn through the flyer without breaking. In such a case it should be seen that the surface of the bobbin must equal the speed of the front roll.

Next, consider that the bobbin is full and under the same condition, that the flyer is moved back to the amount of play generally found, due to the play found in the gears, pin and slot of the flyer and the roving would be strained, would it not? Why? Because the bobbin leads the flyer. Next, consider the same thing with the flyer-lead and we must admit that when the flyer lags behind it causes slack, because the flyer must lead to wind-on.

This should convince any skeptic that the present type of fly-frames (the bobbin leading frames) are a most imperfect machine in any cotton mill where a heavy hank roving is made.

Talking with a former president of a shop whom I met in Boston the other day, he confessed that I was right, but he said, "It is too much of a departure, and the change will never be made, for the reason that it would mean millions of dollars." But how much is the present system costing the cotton industry each day? Think of the weak yarn, cloth, and imperfect work resulting from it.

Who can win that $5 I offered?

Where are the men who can defend the system?

Wash (Mass.)

Those who borrow trouble never get a chance to pay it back.

The Winding-on Problem.

EDITOR COTTON:

Making hard twisted roving for band making is, in most cotton mills, a constant source of annoyance. The reason is in not understanding the winding-on problem.

Some carders blame the new differential motion, while others blame it on the wrong cone gear. There is a little difference in the speed reducing value of the old and new differential motions, but it should be remembered that any extra strain or pull between the rolls and the surface of the bobbins must fall on the cone belt.

The trouble experienced when running hard twisted roving is that the flyers are continually being pulled off the spindles, to fall among the other revolving flyers. Changing the cone gear to remedy this is only an imaginary remedy, because all practical speeder men know that changing the cone gear only changes the position of the belt. As stated, the trouble is in not understanding the winding-on problem.

The idea that when a strand is hard twisted it reduces its diameter when the same draft is used is wrong, both in practice and theory, and is also the cause of the trouble.

The cones should be figured as a continuous string of pulleys and every layer of roving should be figured separately. When hard twisted roving is run, it proves beyond a doubt that it is impossible for any builder of fly frames to construct a pair of cones to suit all hanks, speeds, stocks, flyers, etc. When the strand is hard twisted, a more compact bobbin is produced, and without the aid of the pressure of the presser finger, a factor that is mostly considered when constructing a pair of cones. If the draft of the frame is not increased, the hank roving will be made much heavier by the large percentage of contraction in the roving, a point that is understood by every carder.

However, this is where the mistake is made, because these two extremes are not considered when the change is made. What I mean by the two extremes is the contraction of twist and the pressure of the presser pad being no longer an agent to reduce the diameter of the bobbin.

It should be clear to every speeder man that it is a tight tension that is responsible for pulling the flyers off, and the remedy is simple—change the rack gear. When the tension is tight, the pull from the bottom of the hollow leg of the flyer to the bobbin is very great, and there is a constant tendency always existing at this point to pull the hollow leg of the flyer towards the bobbin, this affects the balance of the flyer, and a vibration is caused that sometimes causes the flyer to be pulled off of the spindle by the pull that exists from the bite of the front rolls to the eye in the presser finger.

The diameter of a hard twisted strand is not reduced by the continuous pressure of the presser finger, and every layer takes up more space, and as stated, the only remedy is a slacker rack gear. It is the great difference between the two rack gears that seems to lead most men astray when running such work.

In mills where this hard twist is made continually, this trouble is seldom experienced, because they have, by a little study, discovered the fact given. The trouble is generally found in mills where orders are received only occasionally. The overseer knowing that it is to be run only for a time, struggles along with such conditions, breaking an amount of flyers, gears and bolsters that amount to quite an expensive item.

Wash. (Mass.)

Maine Central Roundhouse, Waterville, Maine.
Plans drawn by Engineering Department of the Maine Central Railroad at Portland, Maine.
General Contractors: Horace Purinton & Co., Waterville, Me.
Roofer: Wallace A. Hill, Fairfield, Manie.

A severe roofing test---

THE roof of a railroad roundhouse *must be a good roof*—otherwise its life is short. Not only must it withstand the ordinary weather hazards but in addition must resist the sulphurous gases of coal smoke, the flying sparks, the intense heat from the locomotives and the condensation of moisture from the steam exhausts. It must resist all these attacks from both above and below.

The ideal roof for such buildings is a Barrett Specification Roof. That railroad engineers recognize this is evidenced by the fact that such roofs cover a large proportion of the roundhouses of the country. It is under severe conditions that Barrett Specification Roofs show to the best advantage.

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TRADE B MARK

CHANGING PICKER LAPS.

EDITOR COTTON:

You will not find a single carder but will brand as a crime, letting a lap run out at the card.

The most up-to-date picker turns off a finished lap of about 5½ yards in length. The change or measuring gear is about 64. I have changed this 64 gear to 80 and found that I "hit the nail on the head" for two reasons: (1) By making a longer lap, the number of changes is considerably reduced, which gives the card stripper more time to watch the laps and more time to attend to other duties; (2) The lap being much heavier, it makes it impossible for a stripper to carry more than one lap at a time.

Most every reader knows that it is a common practice in many cotton mills to carry two laps at the one time. In such cases a layer or two on every lap is spoiled and much waste results. I wish some of the readers would try out this suggestion and let us know the result. I have tried it and derived much benefit.

What objection can possibly be found against the suggestion? Wash (Mass.)

Notes About Men You Know.

JOSEPH HEYWOOD, night overseer of weaving in the Number 3 mill of the Harmony Company at Cohoes, New York, has resigned his position.

THOMAS BLAIR, JR., formerly second hand of weaving at Harmony Mill Number 2, Cohoes, New York, has been promoted to night overseer of mill number 3 for the same company.

W. E. BUICE, who has been overseer of spinning at the Inman Mills, at Inman, S. C., for twelve years has resigned and will take charge of the spinning of the Drayton Mills, at Spartanburg, S. C.

J. F. PACE, formerly overseer of the cloth room at the Merchants Mills of the Dominion Textile Company, Montreal, Canada, has resigned.

T. I. HICKMAN, of Augusta, Ga., has resigned as president of the Graniteville Manufacturing Company.

LANIER BRANSON will be superintendent of the new Fairfax Mill of the West Point Manufacturing Company at Fairfax, Ala., according to all reports.

DAVE HARRIMAN, JR., formerly assistant superintendent at the Eagle & Phenix Mills at Columbus, Ga., has resigned to accept a position at Griffin, Ga.

CLYDE KING, president of the Georgia Cotton Mills at Griffin, Ga., was one of a party of Atlanta Boosters who attended the meeting of the Board of Governors of the American Cotton Manufacturers Association at Greenville on Nov. 2nd in an effort to bring the next convention to Atlanta.

JAS. JONES has accepted the position of overseer of spinning at the Fairmont (S. C.) Mills.

EDGAR LOVE, president of the Saxony Spinning Company, of Lincolnton, N. C., returned Wednesday from a business trip of several days in Philadelphia.

A. S. HAMMOND has been promoted to the position of master mechanic at the Hartsville Cotton Mills, Hartsville, S. C.

FRANK W. WHITTLE, superintendent of the Pontiac Bleachery of Pontiac, R. I., one of the Knight mills, has resigned. Mr. Whittle is a well known mill man and his retirement comes as a surprise. Mr. Whittle was formerly connected with the Greenwich Bleachery at East Greenwich, R. I., going from this place to the Pontiac Bleachery in 1894. In 1905 he resigned and went to Greenville, S. C., where he was connected with the Union Bleaching & Finishing Company. In 1909 he returned to the Pontiac Bleachery as superintendent.

A. M. HAMILTON, superintendent of the Chesnee Mills at Chesnee, S. C., has recently been East attending the world's series games.

ROBERT W. CUSHMAN has resigned his position with the Sharp Mills, New Bedford, Mass., to accept the night superintendency of the Holmes Mills.

M. P. PETTY, of Gastonia, N. C., has become night overseer of carding at the Sutherland Mfg. Co., Augusta, Ga.

RAYMOND W. PROCTOR, of the Lawton Spinning Co., Woonsocket, R. I., has been made overseer of winding and twisting in place of Alexander Hay, who has been promoted to superintendent.

J. W. CRAB, of Brenham, Texas, has accepted the position of overseer of carding at the Prendergest (Tenn.) Cotton Mills.

J. A. PERKINS, general superintendent of the Utica Steam Cotton Mills, Utica, N. Y., is enjoying a two weeks' vacation with his son in Maine.

CARL J. SHANNON, a graduate of Clemson Textile School, is now designer at the Fairmont (S. C.) Mfg. Co.

E. C. RICEY has been promoted to the position of overseer of carding at the Hartsville Cotton Mills, Hartsville, S. C.

L. O. BUNTON has been promoted from overseer of carding to superintendent of the Lauderdale Cotton Mills, Meridian, Miss.

PROF. C. G. PERKINS has been selected to supervise the installation of the new boiler and stoker at the Lowell Bleachery, Lowell, Mass.

F. L. DRAKE has resigned his position as overseer of carding with the Hartsville Cotton Mills, Hartsville, S. C., to accept a similar position with the Winnsboro Cotton Mills, Winnsboro, S. C.

J. H. GARNETT has resigned as overseer of carding at the Profile Mill No. 1, Jacksonville, Ala., and accepted a similar position at the Selma (Ala.) Mfg. Co.

WM. G. REYNOLDS has resigned as general superintendent of the Lumberton, Dresden and Jennings Cotton Mills, Lumberton, N. C.

V. V. KENDRICK has been promoted from second hand to overseer of carding at the Eva Jane Mills, Sylacauga, Ala.

E. E. BLAKE, who has been superintendent of the Saco-Lowell shops, Lowell, Mass., has been made agent of both plants, the one at Lowell and the other at Saco, Me.

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Cleveland, National Commercial Bank.
Atlanta, Lowry National Bank.

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BUFFALO: Marine National Bank Bldg.

W. V. JONES has accepted the position of overseer of carding and spinning at the Social Circle (Ga.) Cotton Mills.

W. J. HAMILTON, of Gaffney, S. C., has accepted the position of overseer of carding at the Magnolia Mills, Charlotte, N. C.

F. J. REYNOLDS, formerly overseer of spooling, warping and slashing at the Texas Cotton Mills, McKinney, Texas, will be overseer of carding and spinning in the Blending Mill of the Hillside Mills, LaGrange, Ga.

E. G. MADISON has resigned as overseer of spinning at the P. H. Hanes Knitting Co., Winston-Salem, N. C., and accepted a similar position at the Roswell (Ga.) Mfg. Co.

THOMAS HUNTER, who was at one time superintendent of the Victory Webbing Co., at Abington, Mass., will be superintendent of the Blackstone Webbing Co., Pawtucket, R. I., which plant was recently acquired by the Anchor Webbing Co., of Woonsocket.

A. F. BRIGGS, of Greenville, S. C., but formerly overseer of carding at Ware Shoals, S. C., has accepted a similar position at the Grendel Mills No. 1, Greenwood, S. C.

CHARLES FARRELL, a second-hand at the Tremont and Suffolk Mills, Lowell, Mass., has been made manager of the Woodbine Club football team.

A. S. FULLER, Boston, Mass., agent in this country and Canada for John Hetherington & Sons, Ltd., textile machinery manufacturers, is so far recovered from his recent serious operation as to be able to be about again.

ALEXANDER HAY, who was overseer of winding and twisting at the Lawton Spinning Co., Woonsocket, R. I., has been promoted to superintendent, succeeding the late Peter J. Dockray.

W. A. GRAHAM CLARK, a textile expert connected with the Department of Commerce as an investigator of foreign opportunities for the extension of American cotton goods markets, and for some time in charge of the Atlanta office of the bureau, has been appointed director of the Boston branch office of the Bureau of Foreign and Domestic Commerce, succeeding F. L. Roberts.

ARTHUR S. THOMAS, formerly superintendent of the Stark Mills, Manchester, New Hampshire, has accepted the position of superintendent of the Abbeville (S. C.) Cotton Mills.

A. B. EVERETT has resigned his position in the spinning room of the Fountain Inn (S. C.) Mfg. Co., to accept one with the Clinton (S. C.) Cotton Mills.

M. J. HAWKINS has resigned as overseer of carding and spinning at the Patterson Mills, China Grove, N. C.

H. A. HATCH has resigned as overseer of carding at the Marlboro Mills, Bennettsville, S. C., and will return to New England.

W. T. BOYSTER, formerly overseer of carding at the Jackson Mills, Monroe, N. C., has accepted a position in the cotton dry house No. 4, of the Dupont Powder Works, Petersburg, Va.

W. H. GOODFELLOW has been made superintendent of the bleachery of the River Spinning Co., Woonsocket, R. I.

ALEX. WEST, the general sales manager of Rice's Mill White Paint, with Mrs. West, has just returned from a trip to California, where they visited the exposition.

L. E. BAGWELL has resigned his position as master mechanic at the Hartsville Cotton Mills, Hartsville, S. C., to accept a similar position with the Drayton Mills, Spartanburg, S. C.

ROBERT PLACE, superintendent of the Flint Mills, Fall River, Mass., has been selected by Governor Walsh as a trustee of the Bradford-Durfee Textile School to replace the late James E. Cunneen. Mr. Place is highly respected as a man and a manufacturer.

H. B. ELLARD, of Gainesville, Ga., has accepted the position of overseer of carding and spinning at the Kershaw (S. C.) Cotton Mills.

G. P. SMITHEY has resigned as second hand in No. 4 spinning at the Dan River Mills, Schoolfield, Va., to become night overseer of spinning at the Pickett Mills, High Point, N. C.

ROBERT STEERE, master mechanic for the Nashawena Mill, New Bedford, Mass., and Mrs. Steere, are enjoying a trip through the Berkshires and down the Hudson.

A. H. TUCK has resigned as master mechanic and chief engineer at the Drayton (S. C.) Mills, and accepted a similar position at the Chesnee (S. C.) Mills.

BYRON EVERETT EDDY, overseer in the Stevens Mills, Fall River, Mass., was married recently, the bride being Cora Adeline McGowan of Swansea, Mass.

H. L. GANTT, of New York City, consulting engineer and efficiency expert, who has been in charge of the efficiency work at the Saco-Lowell shops, Lowell, Mass., has been appointed superintendent.

J. L. PADGETT, overseer of carding at the Buffalo (S. C.) Mills, has been quite ill but is reported to be improving.

T. G. MOSER has become overseer of weaving at the Fort Mill (S. C.) Mfg. Co. No. 2.

W. D. BURGESS, of High Point, N. C., has purchased and will manage the Laurel Bluff Cotton Mills of Mt. Airy, N. C.

L. W. BRANDER, president of the Brander Cotton Mills, Concord, N. C., has purchased himself a house near the mill.

THOMAS BULLEN, second-hand of weaving at the Pierce Mills, has been made assistant instructor in plain loom fixing and weaving at the textile school, New Bedford, Mass., in place of George Shuttleworth, resigned.

EVERETT H. WALKER, agent of the Lawrence Mfg. Co., Lowell, Mass., has been granted a patent on a circular knitting machine. Mr. Walker is one of the expert knitting machinery men of the country.

WILLIAM L. RAMSBOTTOM, cotton classer at the King Phillip Mills, Fall River, Mass., is instructor of sampling and grading of cotton at the Bradford-Durfee Textile School in place of Arthur D. Lown, who recently resigned his instructorship.

H. W. DOWNEY, who formerly held a position at the Riverside Mills, Augusta, Ga., will be overseer of carding at the new Hillside Cotton Mills, LaGrange, Ga.

JAMES SIMS, overseer of the tenter room at the Farwell Bleachery, Lawrence, Mass., has resigned his position to accept a similar one with the Windsor Print Works.

BENJAMIN F. FAHEY, who has been superintendent of Department 15 and 16 of the New England Cotton Yarn Co., Fall River, Mass., has been transferred to the Bennett Mill in New Bedford, Mass.

G. H. LOCKMAN has resigned as overseer of weaving at the Pelham (Ga.) Mills, and accepted a similar position at the Fitzgerald (Ga.) Cotton Mills.

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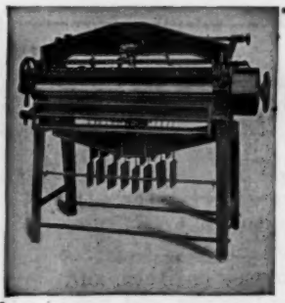

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YOU ONLY NEED ONE MACHINE where before it required two, and you get an extra strip from every bolt of cloth.

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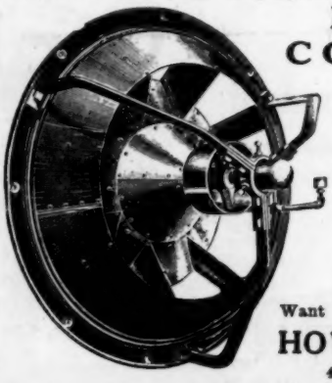

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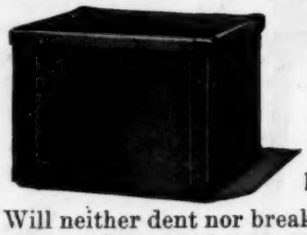

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KNITTING MILL NEWS

Notices of mill projects, additions or improvements are solicited for this department. Other notices pertaining particularly to the Southeastern section will be found in the Southern Mill Situation review.

MISSOURI.

KANSAS CITY.—Goodnow-Brookfield Knitting Company has increased capital stock from $100,000 to $125,000.

NEW YORK.

KINDERHOOK.—The C. P. Hoag Co. of Poughkeepsie, N. Y., has purchased the Van Buren Knitting Co's factory in this town and will operate it for the manufacture of knit goods in the near future.

NEW YORK.—O'Callaghan & Fedden, hosiery selling agents, of 21 East 24th street, have recently organized the Emerald Hosiery Mills, Inc. This new company is capitalized at $80,000 and the officers are: President, Thomas O'Callaghan; treasurer, Henry W. Fedden; secretary and buyer, George Fedden. The mill is located at 4283 Park avenue, New York, and is now in operation on the production of full-fashioned hosiery in silk and cotton.

NEW YORK.—The National Underwear Co. has been incorporated with a capital of $12,000 to manufacture women's underwear, etc. The incorporators are: Samuel and Nathan Rappaport, Samuel Barnet, all of New York City.

UTICA.—It is stated that the plant of the Ritesize Underwear Company will be moved about Jan. 1 to a new location here. The change will provide for a fifty per cent increase in floor space, in addition to other advantages. The company manufactures cotton, worsted and silk-ribbed underwear and men's union suits.

OHIO.

CLEVELAND.—Plans are being made by Bamberger-Reinthal Co., knit goods manufacturers, to erect a building at a cost of about $100,000 on East 27th street, between Payne avenue and Chester avenue. The land faces 320 feet on East 27th street and is 140 feet deep. Company will begin construction early next spring.

PENNSYLVANIA.

DANVILLE.—The new knitting concern reported to have been established at this point will be known as the Purpur & Peckworth Knitting Co.

PHILADELPHIA.—Construction is now under way on the plant of the Ballard Knitting Company, Norristown. The mill is expected to be completed before Jan. 1, to consist of a main building, 60 by 120 feet; five stories; a power house and office building; costing approximately $50,000. It is understood that the present equipment will be transferred to the building and a quantity of new machinery installed, increasing the total to be operated to about 250 knitting and 300 sewing machines. The product of the company consists of underwear, jerseys and knitted cloth for the cutting trade.

PHILADELPHIA.—Harry K. Duffus, Harry D. Brown and J. Clifford Jones have incorporated as the Quaker Robe Company, with a capital of $50,000. The new firm will

Our Hosiery Machines

automatically set up and drop off each stocking and make the anti-ravelling course, and, in addition to the cost of transferring the cuffs of half hose and the sewing of the welts of women's hose, these machines effect very pronounced savings, for instance—in the case of half hose, the ordinary ribbed machine is eliminated entirely, and, of course, the first cost of this machine, its maintenance and floor space, together with the knitting waste, the cost of cutting the ribbed top and the ravelling waste, which in the ordinary practice is unescapable, are entirely saved.

Transfer menders are altogether eliminated and the expense and annoyance of training expert help is avoided.

In respect of the women's hose there is no expense for severing the stockings, no sewing machine operation and consequently no waste on account thereof and a marked decrease in loopers ravelling waste, due to the fact that the stockings are pressed off to a course and not left with a crooked unevenly cut edge.

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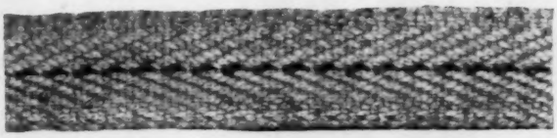

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manufacture bathrobes, underwear, sweaters and wearing apparel of every kind, in cotton, silk and wool. The factory will be located in this city.

PHILADELPHIA.—The Chatham Hosiery Mill has added 40 knitting machines.

PLYMOUTH.—Shawnee Knitting Mill will resume operations after a shutdown of several months while repairs were being made.

READING.—It is reported that the George W. Hawk Company, Inc., mercerized and silk hosiery, will build a mill on property recently acquired. A fire at the plant of the company last May caused damage estimated at $20,000.

The Coal Situation.

The Southern Coal & Coke Company, of Knoxville, Tennessee, in its monthly house organ "The Southern's Coal Notes," is advising its domestic customers to place their orders without delay for several months ahead, and suggests that industrial plants which sell domestic coal to their employees should also follow this advice. In addition to industrial activity which has helped to bring a car shortage on coal roads, the short cool spell the first of October caused Knoxville coal companies to receive more orders for domestic coal in one week than they had received in the entire preceding month. Domestic dealers have been exceedingly late in stocking and there is certain trouble ahead in getting a supply if present business conditions continue or any decided improvement comes. Furthermore, under any kind of conditions, it is certain that domestic prices at the mines will continue to advance with the advance of cold weather. Coal buyers do not seem to appreciate the fact that practically every car of coal is mined on order and no stock can be carried at the mines. Mines must make many grades of coal and cannot always make the grade ordered on the day received. Furthermore, whenever a cold snap comes, everybody seems to order coal at once, which of course cannot be filled at once. Buyers of domestic coal who place their orders now for several months ahead will save themselves trouble and money.

Over the entrance gates to the steel mills at Gary, Indiana, are large electric signs reading: "Did booze ever do you any good? Did booze ever get you a better job? Did booze ever contribute to the happiness of your family?" The great temperance lessons of today are being taught by the great industrial plants in terms of efficiency. In a commercial age it is a most potent argument to put the question of drink upon an economic basis.

W. H. Holbrook Company, converters of cotton goods, at Boston, Mass., announce that they have changed the location of their place of business from 138 Lincoln street, to 207 South street, where they will be pleased to receive their friends and where they will be able to give increased efficiency and better service in their business relations.

What appears an entirely practical idea, in view of the importance of Argentine cotton imports, would be for several American manufacturers of nonconflicting lines of cotton goods to establish there a direct selling agency for their lines under the control of representatives whom they would send there to conduct the business of the agency.

Argentine Cotton Goods Imports.

Imports of cotton goods into Argentina in 1914 were valued at $23,607,425, United States currency, or $16,325,781 less than in 1913. The quantity and value of the imports into Argentina of various kinds of cotton goods in 1914 were as follows:

Articles.	Quantity.	Value.
Quilts ..... pounds..	68,128	$14,900
Raw cotton ..... do....	99,139	13,017
Yarn:		
Colored ..... do....	2,518,471	551,925
Uncolored ..... do....	4,917,496	860,988
Bags ..... do....	872,615	190,979
Bombasine ..... do....	365,476	159,967
Men's shirts ..... dozens..	1,654	12,979
Table covers:		
Cotton ..... pounds..	218,025	88,368
Cotton and wool ..... do....	64,937	42,636
Tape ..... do....	363,584	185,096
Belts ..... dozen..	422	6,111
Counterpanes ..... pounds..	938,344	383,621
Heavy cord ..... do....	98,967	44,109
Belting ..... do....	289,259	76,140
Corsets ..... dozen..	5,167	52,766
Curtains ..... pounds..	57,406	60,003
Lace ..... do....	441,050	48,934
Bandages ..... do....	79,041	34,598
Wickings:		
For wax matches ..... do....	971,144	191,288
For lamps ..... do....	37,275	9,790
For candles ..... do....	53,204	11,643
Blankets		
Cotton ..... do....	273,580	85,800
Cotton and wool ..... do....	4,343	2,281
Cotton, fleeced ..... do....	892,854	117,244
Caps ..... dozens..	937	2,253
Gloves ..... pounds..	38,741	55,307
Thread:		
Ordinary	.....	666,568
Coarse ..... pounds..	545,990	238,980
For weaving ..... do....	92,082	20,153
Elastic garters ..... dozen pairs..	17,005	8,204
Canvas:		
White ..... pounds..	581,244	139,931
Colored ..... do....	286,757	75,310
Tablecloths and napkins ..... do....	195,658	94,439
Handkerchiefs:		.....
Stockings ..... do....	1,298,321	1,307,082
Cotton ..... do....	671,933	452,748
Cotton and silk ..... do....	13,379	35,139
Passementerie ..... do....	31,786	39,653
Cloaks ..... do....	39,773	26,115
Dusting, polishing cloths, etc..... do....	282,136	74,047
Hats ..... dozens..	5,919	20,032
Cloth:		
White ..... pounds..	6,566,557	2,417,349
Unbleached ..... do....	2,536,062	572,048
Printed ..... do....	5,801,794	2,401,100
Dyed ..... do	21,028,994	7,815,446
Cotton and wool ..... do....	1,646,251	868,824
Knitted ..... do....	5,339	3,962
Cotton and silk ..... do....	657,122	1,150,534
Suspenders ..... dozens..	57,616	92,978
Towels ..... pounds..	255,271	165,272
Floor and kitchen cloths ..... do....	709,802	62,138
All others	.....	1,546,721
Total	.....	23,607,425

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It is really impossible to dispense with all tire troubles but it is claimed they can be reduced to the smallest minimum if DOUBLE SERVICE TIRES are used. The additional thickness makes it possible to secure great mileage from the tires with little of the common tire troubles. It is also a punctureproof tire for the number of plies of fabric and rubber cannot be punctured with an object such as a tack as it cannot penetrate through all this material. Nails and the like generally glance off before they reach the tube. These tires are in use in all parts of the country by men who dislike tire worries and wish tire service. Regardless of their many good qualities over all others, they are sold at a very reasonable price which is affected by a well organized sales system by the factory that makes them. The DOUBLE SERVICE TIRE AND RUBBER CO. of Akron, Ohio, sells these tires direct to the consumer.